

# Railroad Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY BY  
THE RAILROAD GAZETTE (INC.), 83 FULTON STREET, NEW YORK.

CHICAGO: 160 Harrison St. PITTSBURGH: Farmers' Bank Bldg.  
LONDON: Queen Anne's Chambers, Westminster.

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The address of the company is the address of the officers.

Subscription, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free.

United States and Mexico.....\$5.00 a year  
Canada.....\$6.00 a year  
Foreign Edition, London.....£1 12s. (\$8.00) a year  
Single Copies.....15 cents each

Entered at the Post Office at New York as mail matter of the second class.

VOL. XLVI., No. 21.

FRIDAY, MAY 21, 1909.

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The New York State Public Service Commission, Second district, has held a hearing on a complaint of shippers at Troy who since January 1 have been denied the help which was formerly given by the railways in loading carload freight. Rates on carload freight are based on the assumption that the railway shall not be obliged either to load or to unload the goods, but at Troy the freight agents had been so free with their assistance that now the shippers are claiming that their expenses are materially increased—in some cases as much as two or three dollars a car. This question has been settled rationally by the Interstate Commerce Commission and it would seem that the Albany hearing was a waste of the shippers' and railway officers' time. The federal decision that such aid, if granted, must be regulated by proper rules, printed in the tariffs, is the only proper principle for adoption in New York state, or any state. Like demurrage, this "concession" is difficult to regulate satisfactorily. Irregularities in connection with it are pretty sure either to be too small to call for formal notice, or else become rate cutting devices. The Troy shippers' demand is exactly parallel to a demand for a reduction in freight rates. There have been many cases where the railways began the helping process as a means of cutting the rate (below that of some competitor) and such can have no ground for surprise if the public ask

to have the cut made permanent. If the matter could be kept free from the rate cutting feature it might well be that economy would in some cases be got by railway employees and shippers' employees working together in loading a car. A freight house man by giving an hour's time can often save the shipper a half day's time. A shipper, on the other hand, can often do the railway a similar favor in handling less than carload freight. Perhaps the only practicable course for the state is to make practice uniform—without much regard to these conveniences. For sinners and saints rules need to be straight and rigid. When we all become saints rules may have gentle curves to the end of convenience and economy.

Outside of the individual investors in railway securities there are three big groups: (1) The savings banks, (2) the large trust corporations and (3) the great body of individual trustees. Of these, generally speaking, the savings banks and individual trustees are held down pretty closely by investment statutes while the trust companies—in which may be included insurance corporations—have pretty large latitude. In between, however, there is a corporate group of investors which, better than the others, supplies a real test of the quality of railway investment. It is represented by such institutions as Yale and Harvard universities where usually freedom of investment is allowed the treasurers subject to the judgment of investment committees. Their investment policy may be described under the three words freedom, conservatism, discretion. Harvard's financial report just published shows that she has vested funds of \$20,269,992, of which \$5,261,512 are in railway bonds and \$1,612,909 in railway stocks. Yale's last annual report shows that out of \$8,513,193 investments—excluding cash—she has \$2,658,723 in railway bonds and about \$600,000 in railway stocks. Practically all the railway investments of both universities are of a conservative kind. Expressed in ratios about 34 per cent. of Harvard's funds are in railway securities and somewhat more than 38 per cent. of Yale funds are invested in the same line—or, taking two universities together out of total funds of \$28,783,185 there are \$10,135,144, or more than 35 per cent. invested in railway securities. A qualifying fact is that such institutions as Yale and Harvard often have shady railway securities willed to them but, as they are usually sold quickly, the fact is not an important one. The figures are impressive and interesting. The two universities with their great funds are large types of other eastern institutions of the same kind in a highly capitalized region of the country; they indicate a most striking likeness of railway investment policy, not only in character but in degree; and they certify to a bed-rock confidence in conservative railway investment which must give the well-managed railway corporations good cheer.

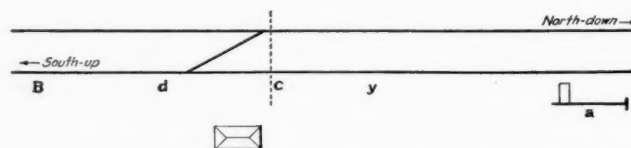
The doctrine, originally enunciated, we believe, by Judge Landis in the Standard Oil case, that any departure from a legal rate, or any use by a railway or a shipper of a rate that has not been published, filed and posted, is a crime regardless of the intent and effect of the act, is being fast knocked to pieces by the higher federal courts. It was repudiated by the United States Circuit Court of Appeals for the Seventh circuit in reversing Judge Landis in the Standard Oil case. It has now been repudiated by the United States Circuit Court of Appeals for the Ninth circuit in reversing Judge Wellborn in the case in which the lower court fined the Atchison, Topeka & Santa Fe \$330,000 for the alleged giving of rebates to a shipper of lime. The Circuit Court of Appeals held explicitly in the Santa Fe case that to constitute a crime there must be not only a departure from the published tariff, but that the departure, in the language of the Elkins law, must be "wilful." That is, before a criminal act is committed the published rate must be departed from knowingly, deliberately and intentionally, and not merely inadvertently or mistakenly, or, perhaps as in the Santa Fe case,

for the purpose of making good a loss that a road has caused to a shipper. It has been asserted that the decisions of the higher courts in the Standard Oil and the Santa Fe cases have "weakened" the law against rebate. As a matter of fact, they have merely established that a wrongful intent is an essential element of rebating just as it is of every other crime and have made the law less dangerous for innocent persons, although probably no less dangerous for the guilty. The doctrine enunciated by Judges Landis and Wellborn was strange to Anglo-Saxon jurisprudence. The fact that when the original decisions in these cases were rendered they were received with enthusiastic public and official approval, while their reversals have been received with hardly any manifestations of public disapproval and with no fulminations of official displeasure at Washington, indicate that both official and public sentiment regarding railway matters are growing more intelligent and fairer.

The statistics which we published recently (*Railroad Age Gazette*, April 23, page 915) showing the effect of 2-cent fare legislation on the Rock Island lines throw interesting light on the psychology of travel. The advocates of such legislation confidently predicted that it would cause so great an increase in passenger traffic that the railways would make more money on a 2-cent fare than they had made on a 3-cent fare. But the statistics alluded to demonstrate that the reduction in fares caused no increase in travel at all. There was a substantial increase in number of passengers carried one mile; but that this was not due to fare legislation seems to be proved by the fact that the average percentage of increase in the number of passengers carried one mile was as great in the states where a 3-cent, and even a 4-cent, fare was maintained as in states where the fare was reduced to 2 cents. The only effect of the 2-cent-fare laws was to cause a reduction in railway passenger earnings at a time when it was especially hard for the roads to bear it. Many academic writers state that a reduction in railway rates will cause an increase in traffic, as if this were one of the immutable and invariable laws of railway economics. Why, then, did the cause fail to produce its usual effect in this case? The answer is, that whether a reduction in rates will cause an increase in traffic depends on the conditions under which it is made and the kind of traffic to which it is applied. A reduction in the freight rate on a bulky, cheap commodity, such as stone or coal, is pretty sure to cause an increase in traffic, because the rate enters largely into the price of the commodity at the market. But no conceivable reduction in the rate on a valuable commodity such as hats would cause an increase of an ounce in the traffic. Now, passengers for the most part are high-class traffic; and they are like high-class commodities in that no practicable reduction in the flat rate on them is apt to cause an increase in the number of them transported. If in the ordinary course of affairs a man wants to move with his family 500 or a thousand miles, or to take a business trip, he will pay 3 cents as readily as he will pay 2 cents; and on the other hand a flat 2-cent rate will no more cause him to make a trip in the ordinary course of affairs than he would not otherwise take than will a 3-cent rate. But suppose the usual rate is 3 cents and the railways make for a short period, or for some particular occasion, a 2-cent rate. Then, many people will go on trips to take advantage of the reduced rate, which if the usual rate were 2 cents, they would never go on at all. Similarly, the development of some new facility of transportation, such as electric interurban railways, may create a large amount of new passenger traffic, not so much because of the relatively low rates charged by them as because of the frequent and convenient service afforded. By making special reduced rates the roads may increase the total traffic; and this—because of the relatively large numbers handled per car and per train on such rates—not only without a decrease, but with an increase in their net revenue

from passenger business. But a reduction in the ordinary flat rate neither increases the total business nor in any case causes the increase in the number of passengers per car or per train that is necessary to enable a road to haul passengers on a reduced rate at a profit.

The risk that is incurred when a crossover is incompletely signaled because it is not often used is illustrated in a disastrous collision of freight trains that occurred on the Midland Railway of England a few weeks ago. Incidentally American signal engineers will be reminded of the value of track circuit locking. This simple precaution would have prevented the collision in this case, but the government inspector makes no mention of it. Indeed, his suggestion that a dwarf signal ought to have been in use is made in the mildest possible form, though that also would undoubtedly have prevented the disaster. The collision occurred at Sharnbrook February 4, about 4 a.m. A northbound freight was standing on the southbound track at B (see diagram) waiting to follow a superior train. The superior train having passed, the signalman set the switches, as he supposed, for the crossover, and gave a



hand-lamp signal for the train at B to start; and the train started. In fact, the crossover switches had not been set and the train continued along track *y*. As soon as the rear car of the train had passed the point *c*, the signalman, setting normal the lever which he had reversed, cleared signal *a* for the southbound train. The engineman of the northbound soon discovered that he was on the southbound track; but not until he saw signal *M* cleared did he take active measures to set back, for he assumed that he was being sent forward for some local purpose. He had got back to or south of his original position when the collision occurred, killing the engineman and fireman of the southbound train, which was running at 55 miles an hour. It appears that the signalman, instead of pulling lever 8 for the crossover, must have pulled lever 7, which was for another switch and which was free to move. There was no fixed signal at *d*, hence the giving of the signal by hand. The signal cabin, though exactly opposite the crossover, is 46 ft. from track *y*, there being two freight tracks between it and the passenger tracks. This man had been a signalman 34 years and at this cabin 21 years.

#### RAIL SECTIONS AND SPECIFICATIONS.

In the *Railroad Gazette* of September 6, 1907, we gave in parallel columns the rail specifications of the American Society of Civil Engineers, the American Railway Engineering & Maintenance of Way Association, and the American Society for Testing Materials; and in the issue of December 20, 1907, the rail specifications proposed by the American Railway Association. In both of the above issues we commented fully on the difference in the requirements of these specifications.

In April, 1908, the American Railway Association adopted new specifications for both Bessemer and open-hearth steel rails, and referred these specifications, with their rail sections, to the American Railway Engineering & Maintenance of Way Association by the following resolution:

"Your committee respectfully recommends that the series of sections of types 'A' and 'B' and the specifications for Bessemer and open-hearth steel rails, submitted with this report, be adopted as the recommended practice of the association, and that the sections and specifications be referred to the American Railway Engineering and Maintenance of Way Association, with the request that they follow up the question of determining the details as to drop test, etc., by observing the actual results of rails rolled under the new sections, and that they also ar-



range to collect from the different members and tabulate all information as to comparative wear of rails rolled from the different parts of the ingot, and all other information necessary to a proper study of the problem. That they be further requested to keep careful record of the comparative results in service of rails of types 'A' and 'B,' and to prepare and submit to this association a single type of section which will embody their ideas as to the best type that can be designed for use as a single standard to be adopted by this association, giving due weight to every factor entering into the problem.

"Respectfully submitted,

"The Committee on Standard Rail and Wheel Sections."

On January 1, 1909, the Steel Manufacturers of America issued standard specifications for Bessemer and open-hearth rails.

A great deal of work has been done during the past year by the committees of the American Railway Association, the American Railway Engineering & Maintenance of Way Association and by the Manufacturers, who have co-operated with these committees in every way. As a result of this the new specifications of the American Railway Association and of the Manufacturers may be considered the latest thought in specifications and practice in the manufacture of steel rails. The general requirements of these two specifications agree very closely and will be of great assistance to committees of other engineering societies in settling the points of difference in their specifications.

In order to put this matter clearly before those interested in the subject, we give on another page, in parallel columns, all of the five specifications referred to for Bessemer and open hearth steel rails brought up to date.

For convenience of comparison, the sequence of the paragraphs has been slightly modified to adapt them to the specifications adopted by the American Railway Association. The requirements of these specifications are given under 13 headings, more than half of which are practically the same in all specifications. The material differences in the other requirements have been printed in italics (except in the tables of chemical content, all of which differ), and are as follows:

**Process of Manufacture.**—Omitted in Manufacturers specification; practically the same in other four, except per cent. of discard to remove piping; is now in general practice, merely a matter of price when greater than the customary discard is required; is still being investigated.

The committee on Standard Rail & Wheel Sections of the American Railway Association, in its report of March 23, 1908, to the association, stated:

"In pursuing its investigation of this discard question, the committee received a suggestion from William Metcalf to the effect that it would be reasonably practicable to apply the above theory to the manufacture of rails by arranging to test to destruction a number of rail butts representing a certain proportion of the total output, and to base rejections on the results of these tests.

"In order to determine the practicability of this suggestion, the committee arranged for a trial lot of rails to be rolled from the ingot without any discard whatever except such as was necessary to enable the bloom to enter the rolls, and after these rails had been cut into small pieces, they were broken under the hammer and the fracture examined. This test proved to the satisfaction of the committee that if 'pipes' or other physical defects were present they could be detected by this means. The test also proved quite conclusively that it is possible to so conduct the process of manufacture that the 'pipes' or other physical defects will be reduced to a minimum, and that these defects may not occur at all, even in rails rolled from the top portion of the ingot.

"In order to avoid an unnecessary waste of good material, the committee set about to devise means by which the rejection of defective material could be insured without requiring an arbitrary and definite percentage of discard in every case, and a committee of the Pennsylvania Railroad, pursuing the same line of investigation, adopted a tentative specification which provided for a physical test of this nature, and which further provided that when physical defects were discovered, all top rails of the heat should be rejected. This would result in a discard of about 25 or 30 per cent. of the entire metal in the heat whenever physical defects were discovered, and it was felt that a requirement of this nature would not only provide for the rejection of defective material, but would insure the greatest care on the part of the manufacturer.

"A trial lot of rails, of a section corresponding to type 'B' submitted with the committee's report of last October, was recently rolled under this specification as to discard, and the results convinced the

committee that a development of this idea would prove the best solution of the discard problem."

#### Chemical Composition.—

##### Chemical Requirements for 100-lb. Rail.

	C.	Mn.	Si.	P.	S.
American Ry. Assn.....	.46 to .56	.90 to 1.20	.10 to .20	.10	.075
Manufacturers' .....	.45 " .55	.84 " 1.14	.20 max.	.10	...
A. S. C. E.....	.55 " .65	.80 " 1.05	.20 "	.085	.075
A. R. E. & M. W. Assn....	.55 " .65	.80 " 1.05	.20 "	.085	.075
A. S. T. M.....	.45 " .55	.80 " 1.10	.20 "	.10	...

The committee on Standard Rail & Wheel Sections of the American Railway Association, in its report of March 23, 1908, to the association, stated:

"In the matter of chemistry specifications for Bessemer steel rail, statistics were obtained from the officers of the Ore Producers' Association which convinced the committee that it would be impossible for the mills to furnish more than a small percentage of the total rail requirements of the railways with a phosphorus specification less than .10.

"The optional specification for .085 phosphorus prepared by the joint committee of manufacturers and railway men is now in the hands of all members, and is therefore available for use by those who are able to obtain low phosphorus Bessemer rails. It is not considered proper, however, to require less than .10 phosphorus in a specification intended for general use. Members desiring to obtain low phosphorus rails will have the further option of using open-hearth steel.

"The committee conferred with a number of disinterested experts on both the discard and phosphorus questions, and among the principal authorities consulted were William Metcalf, of Pittsburgh; Robert Forsyth, of Chicago, and Henry M. Howe, of Columbia University. These gentlemen all agreed that it would be preferable to test the finished product rather than specify a fixed percentage of discard, and they also agreed that it would be unreasonable to require less than .10 phosphorus in a specification for Bessemer rails intended to cover purchases for all American railways."

#### Shrinkage.—

##### For 100-lb. Rail in 33 Ft.

Am. Ry. Assn.	Mfrs.	A. S. C. E.	A. R. E. & M. W. A.	A. S. T. M.
6 1/2 in.	6 3/4 in.	6 1/8 in.	6 1/8 in.	7 1/8 in.

The Manufacturers have made concessions on this point and their allowance of 6 3/4 in. is now practically within the permissible variation of 1/4 in. in length, and it would seem as though 6 5/8 in. should be satisfactory to all.

**Drop Test.**—The American Railway Association and the Manufacturers' specifications call for 18 ft. drop on 100-lb. rail. The American Society of Civil Engineers and the American Railway Engineering & Maintenance of Way Association call for 22 ft. on 100-lb. rail, and the American Society for Testing Materials for 19 ft.

The drop testing machine has been standardized, and it is claimed that the lower drop of 18 ft., called for under the new conditions, is equivalent to the higher drop of 22 ft. previously specified.

All the specifications, except the Manufacturers, provide for the test piece to be taken from the top of the ingot. The Manufacturers provide for the test piece to be selected from each blow of steel, which would permit the inspector to take it from the top of the ingot if he desired. All specifications provide for a drop test to be made from each heat of steel.

**Section.**—The American Railway Association specifies its own sections; Manufacturers specify A. S. C. E. sections; others say A. S. C. E. sections, unless otherwise specified.

**Straightening.**—Limits of variation out of line in 33-ft. rail before cold straightening:

The American Railway Association and the American Railway Engineering & Maintenance of Way Association specify 3 in., the others 5 in. Still being investigated.

The American Railway Association specifies that rails while on the hot beds shall be protected from coming in contact with water or snow. This provision will no doubt become universal, as its importance is self-apparent.

**Branding.**—The American Railway Association and the Manufacturers' specifications provide that the rails shall be marked consecutively "A," "B," "C," etc., to indicate position in the ingot, "A" being the top of the ingot.

Others do not have this requirement, but will no doubt adopt it, as it has come into general practice.

The American Railway Association provides that with a

discard of 20 per cent. or more, the letter "A," representing the top of the ingot, will be omitted.

**No. 2 Rails.**—The American Railway Association specifies the limit of depth of flaws  $\frac{1}{4}$  in. deep in head and  $\frac{1}{4}$  in. in flange. The Manufacturers and the American Society of Civil Engineers specify  $\frac{1}{4}$  in. deep in head and  $\frac{1}{2}$  in. in flange. The American Railway Engineering & Maintenance of Way Association and the American Society for Testing Materials specify that only such defects will be accepted which do not impair the strength of the rail. This would no doubt justly condemn many rails which would pass the other specifications.

The American Railway Association, the Manufacturers and the American Society of Civil Engineers specify that two center punch marks shall be put on each No. 2 rail.

The American Railway Association, the American Society of Civil Engineers, the American Railway Engineering & Maintenance of Way Association and the American Society for Testing Materials will not accept rails as No. 2 from heats which failed under drop test. Manufacturers have no such provision.

**Inspection.**—The American Railway Association and the Manufacturers provide that the drillings for analysis shall be taken  $\frac{1}{4}$  in. beneath the surface. Would it not be desirable to have this requirement appear in all specifications?

#### OPEN-HEARTH STEEL RAILS.

##### Chemical Composition.—

##### Chemical Requirements for 100-lb. Rails.

	C.	Mn.	Si.	P.	S.
American Ry. Assn. ....	.70 to .80	.75 to 1.00	.10 to .20	.04	.06
Manufacturers' .....	.62 " .75	.60 " .90	.20 max.	.04	..
A. S. C. E. ....	.65 " .75	.80 " 1.05	.20 max.	.05	.06
A. R. E. & M. W. Assn. ....	.75 " .85	.90 max.	.075 to .20	.03	.06
A. S. T. M. ....	Considering open-hearth specification.				

**Branding.**—The American Railway Association and the Manufacturers' specifications provide that each rail shall be marked consecutively "A," "B," "C," etc., to indicate position in the ingot, "A" being the top of the ingot.

The other specifications have not this requirement, but will no doubt adopt it, as it has come into general practice.

The American Railway Association provides that with a discard of 20 per cent. or more, the letter "A," representing the top of the ingot, will be omitted.

The American Railway Association and the Manufacturers specify that each rail shall be marked O. H. to designate quality; this will no doubt be generally adopted.

**Inspection.**—The American Railway Association and the Manufacturers' specifications provide that the drillings for analysis shall be taken  $\frac{1}{4}$  in. beneath the surface of the test ingot.

Would it not be desirable to have this requirement appear in all specifications?

The American Railway Association and the Manufacturers' specifications provide that the inspector shall be furnished with complete chemical determinations for each heat of steel. This requirement will no doubt become universally adopted.

The adoption and general use by the railways of the United States and Canada of the standard forms for reporting behavior and failures in service of rails from different parts of the ingot will result eventually in much valuable information and assist in reaching uniform specifications; but many of the differences referred to above can be harmonized at once, as they do not depend on information other than that already before us.

More attention is now being paid to the condition of the rolling stock and roadbed and their bearing on the life of the rail, and it is frankly admitted by all concerned that the question of service and life of a rail, or what constitutes a good rail, is not one-sided by any means.

Dr. P. H. Dudley, in the discussion of the report of the committee on Standard Rail & Wheel Sections, American Railway Association, stated that his new specification requires that the metal shall be recarburized in the converter in preference to the ladle and held there two and one-half minutes

before being poured into the ladle. The nozzle for teeming the ingots to be  $1\frac{1}{2}$  in. instead of 2 in. and  $2\frac{1}{2}$  in., and in some instances 3 in. The ingots for 100-lb. rails to be only for three lengths instead of four lengths, as formerly. He claims by using this method that the percentage of second quality rails has been reduced from 10 per cent. and 15 per cent. down to 3 per cent. for a single week, the ingots bloom well without cracking, few checks are found in the base or head of the rails, and the metal is exceedingly tough.

The Ordnance Department, United States Army, called in a committee of engineers and manufacturers to co-operate in an exhaustive investigation on the physical structure of ingots, blooms, rails from different passes, finished rails, etc. This work is being conducted at the Watertown Arsenal, and a preliminary report of the results obtained was made at the last annual convention of the American Society for Testing Materials. A further report will be presented at the approaching convention of this society, to be held at Atlantic City, June 29 to July 3, bringing the work up to date.

In this investigation, ingots have been selected from both Bessemer and open-hearth steel heats, and were given different heat treatments before rolling. Blooms from these ingots, with different amounts of work on them, were secured. In addition to this, lengths of unfinished rails from the different passes in rolling, and the finished rails, were obtained from ingots with the different heat treatment.

The ingots were cut into slices, lengthwise as well as crosswise; the same method was followed with the other sections and finished rails. The effect of rolling, on the internal structure, is being most carefully studied, starting with the well-known defects due to blow holes, piping, etc., in the ingot, and following the work of the blooming mill, roughing rolls and finishing rolls, in order to see if these defects are closed up or increased, also if internal defects are produced on portions of the ingot which were sound.

The results up to the present show that it is imperative to have additional heats of steel manufactured and rolled under such conditions as will tend to increase the internal defects already found, and also under such other conditions as will tend to eliminate these defects.

Particular attention will be given to the effect of work on ingots of different cross sections, as it is claimed that better results can be obtained from ingots of smaller cross sections than from those of larger cross sections in general use.

The manufacturers are equally interested in this work with the engineers, and will no doubt be willing to modify their methods in any way which may be proven to be necessary to produce better rails.

Under the direction of the American Railway Engineering & Maintenance of Way Association, the Watertown Arsenal is also making an exhaustive series of tests on completed rail joints. The results will no doubt be given out within the next year.

#### NEW PUBLICATIONS.

**Accounts—Their Construction and Interpretation.** By William Morse Cole, A.M., Assistant Professor of Accounting in Harvard University. 345 pages, 6 in. by 8 $\frac{1}{4}$  in.; cloth. Published by Houghton, Mifflin & Co., Cambridge, Mass.

Mr. Cole has prepared a thorough and philosophic treatise on the theory, construction and interpretation of accounts. He keeps well away from the idea, only too prevalent among accountants, that their profession is an abstruse one, and must be surrounded by mystery and high theory, and makes his discussion simple and practical. He also understands clearly that accounts are a means and not an end; a distinction that is often lost sight of in the profession.

The book is divided into two main parts, the first dealing with the principles of bookkeeping and the second with the principles of accounting. The first part has chapters on debit and credit, on the fundamental books, the significance of par-



ticular accounts, the trial balance, the statement and the balance sheet and all labor-saving devices. The second part of the book, covering the principles of accounting, occupies a considerably greater proportion of the total, and has chapters on the distinction between capital and revenue, the general principles of depreciation, cost accounting, capitalization, railway accounting, bank accounting, trust accounting, factory accounting, etc. The work has been well and thoroughly done, and is supplemented with a number of appendices and with a good index. We are inclined to think that certain parts of the discussion run a little too much to the abstruse, as, for example, in the compilation of bond yields, in the appendix on page 331. The yield of a bond selling above or below par, as complicated by amortization and reinvestment, has always been one of the pet problems of the accountant and the mathematician, and it can be made one of the most complicated and least satisfactory mathematical studies in the world. As a matter of fact, the practical banker or investor does not make his calculations that way. If a 4 per cent. bond maturing in six years is selling at 94, he calculates that the income yield from it is approximately  $4\frac{1}{4}$  per cent., and that the additional yield accruing from the retirement of the bond at par is equal to about 1 per cent. a year besides. In quoting the yield of a bond at a given price, he takes a figure off his table already prepared; if he had to prepare it himself the chances are probably ten to one that he would get it wrong, according to the strict conventions of the art. This is the kind of computation that inebriates, but cheers not!

On the whole, however, Mr. Cole views his accounting very much from the outside and not from the inside, and his book is distinctly a useful one.

*Annual Statistical Report of the American Iron and Steel Association*, containing complete statistics of iron and steel industries of the United States for 1908 and immediately preceding years; also statistics of the coal, coke and shipbuilding industries of the United States, immigration, etc.; also statistics of the iron and steel industry of foreign countries. 92 pages, 6 in. by 9 in.; paper. Price \$5. Published by the American Iron and Steel Association, 261 South Fourth street, Philadelphia.

The annual statistical report of the Iron & Steel Association is published in the usual form. It contains full statistics of the iron and steel trades and other collateral statistics as well, and has been prepared with scrupulous care and fidelity. It is one of the necessary statistical documents of the country.

## Letters to the Editor.

### MODERATE SUPERHEAT FOR LOCOMOTIVES.

Chicago, May 5, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

An article by Lawford H. Fry, in the March 5th issue of your journal, p. 459, has been adversely criticised by H. H. Vaughan in the issue of April 9th, p. 789.

While I am a firm believer in and an advocate of a moderate degree of superheat for locomotives in ordinary practice and would, therefore, defend Mr. Fry's side of the argument, yet I must first attack his article because of the inaccuracies contained therein.

To the reader who is not very familiar with the laws and principles of thermodynamics, the inaccuracies might be overlooked unless he began an investigation to check out the figures in the tables on p. 461.

The comparative expansion diagrams on p. 460 are wrong in general construction and also in the detail work of construction. Mr. Fry has two curves of the same family of the hyperbolic form;  $p v^n = \text{const.}$ , with different exponents starting from the same point and passing through another common point. Such a construction is impossible. A casual glance shows that the upper curve is drawn as a straight line from about 62 per cent. of the stroke to the back pressure line at

the end of the stroke; the lower curve is drawn as a straight line from 67 per cent. of stroke to back pressure line at the end of the stroke. These curves may be well flattened out towards the end of the stroke, but should not be drawn to the back pressure line at end of stroke. Such construction involves complete expansion to back pressure, which is impractical.

The terminal pressures for these curves may be found as follows: The clearance being assumed as 8 per cent. of the stroke, the cut off as 25 per cent., the initial pressure as 155 pounds absolute, and the exponents taken as 1.3 and 1.1 for high and moderate degrees of superheat respectively, then the terminal pressures will be deduced. For upper curve, high superheat

$$\begin{aligned} p_1 v_1^{1.3} &= p_2 v_2^{1.3} \\ p_1 &= 155; v_1 = 8 + 25 = 33 \\ v_2 &= 8 + 100 = 108 \\ p_2 &= p_1 \left( \frac{v_1}{v_2} \right)^{1.3} = \left( \frac{33}{108} \right)^{1.3} = 0.305^{1.3} \\ &= 0.214 \\ p_2 &= 155 \times 0.214 \\ &= 33.2 \text{ pounds.} \end{aligned}$$

For lower curve, moderate superheat

$$\begin{aligned} p_1 v_1^{1.1} &= p_2 v_2^{1.1} \\ p_1 &= 155; v_1 = 8 + 25 = 33 \\ v_2 &= 8 + 100 = 108 \\ p_2 &= p_1 \left( \frac{v_1}{v_2} \right)^{1.1} = \left( \frac{33}{108} \right)^{1.1} = 0.305^{1.1} \\ &= 0.271 \\ p_2 &= 155 \times 0.271 \\ &= 42.0 \text{ pounds.} \end{aligned}$$

The terminal pressures are 33.2 and 42.0 pounds respectively.

Extensive investigation to determine the exponent in the equation of the compression line reveals that this line was not constructed according to the laws governing the change of pressure and volume of steam when compressed. Since the portion under the compression curve is foreign to both cards alike, the error of construction may be neglected. The error is material, however, in the construction of the expansion curves.

Since the curves are wrong the computation is necessarily wrong and the conclusions made therefrom must be wrong.

Fortunately, however, an error in calculation does not involve that there will be an error in the results of the superheated steam in its action.

A consideration of the actual operation of steam in a cylinder does not involve two expansion curves. When heat is added to water the temperature and pressure increase. If some provision is made so that the pressure can not increase the added heat changes the water to steam. While the steam is in contact with the water no additional heat will be taken up by the steam, if, however, the steam is removed from the water chamber it will take up more and more heat. Steam in the latter state is called superheated steam.

When superheated steam comes in contact with colder metallic conductors it yields heat to the metal. The heat of superheat is first yielded, then the latent heat of the steam which involves the condensation of the steam. The same laws for giving up heat apply to steam when expanding and doing work. The work is done at the expense of the heat in the steam.

One great reason for lack of economy in a steam engine is due to cylinder condensation, or the transference of the heat of the steam to heat in the cylinder. As soon as moisture forms on the cylinder walls they become more susceptible to cylinder condensation.

The great gain due to superheat is from the fact that the heat of superheated steam is given to the cylinder walls with no resultant condensation of steam. Practice has shown that

the first few degrees of superheat are always the most beneficial, due to the fact that the condensation does not accumulate.

High superheat will prevent cylinder condensation and if high enough will prevent the natural condensation of steam due to the adiabatic expansion of steam. When such a condition is maintained the efficiency is lessened, due to a rejection of more heat in the exhaust steam than if there had been no superheat after cut-off.

If then there is to be an application of superheated steam to practical conditions, the aim must be not to get superheat after cut-off but to get it previous to cut-off; in which event the expansion curves will be identical, but the actual steam consumption will vary.

The relative advantages of superheaters will depend upon the type, design and method of operation. One type of superheater with moderate superheat may prove unsuited to practical conditions of operation, when another type may prove very satisfactory. The trend of progress to-day is toward the efficient superheater with moderate superheat.

H. B. MAC FARLAND, M.M.E.

#### THE ECONOMICS OF GRADE REVISION.

New York, May 10, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

After discussing the economics of operation with a prominent superintendent of motive power, who has given both sides of the question close study, I submitted a profile of an existing line, without data showing the locality, and with it, in the form of a hypothetical question, sufficient information to enable him to answer from his viewpoint as to the best method of treating the line in order to obtain the maximum operating results.

The summary of his answer, conforming fully to my own views, was, "Increase the unit capacity of your power."

There is, of course, a limit to the length and also to the weight, which can be handled with facility in one train. Up to that limit any train provided with the necessary power to haul it up grade and control it down grade may be handled over most of the existing grades with safety and promptness. Furthermore, it is entirely practicable for the motive power designer to produce engines that will accomplish this result.

A troublesome feature of the power in general use is that standard types of engines are furnished for indiscriminate use on all parts of a system.

The system may comprise all kinds of line from long stretches, even whole engine divisions, of practically level straight line, to heavy mountain grades with excessive curvature, yet we attempt to cover all these conditions with the same type of power. In the operation of the road this simply results in "breaking up" the freight trains at the end of almost every engine division in order to rearrange them for the changed physical conditions of the next engine division.

In considering schemes of revision it may be thought rather hard to determine when to stop power revision and begin grade revision, but in either case the point must be kept in mind that there is a limit to the weight and length of trains, beyond which they cannot be operated with facility. In other words, even though it were possible to revise an engine division to a straight level line, there is an operating limit to the size of train to be handled over it, and up to this limit trains may be handled over most of the grades on the existing lines.

If this position is tenable, then nothing is gained by grade revision that cannot be obtained from properly designed power, and the question as between power revision and grade revision is the old one of relative cost—now grade revision represents a fixed cost in the form of capital charges, maintenance charges and a part of the cost of operating that portion of the old line which cannot be abandoned, all of which, except the

cost of wear of rails and ties are the same, regardless of tonnage handled. The cost of power, including shops, round-houses, etc., consists of capital charges, maintenance charges (the latter in the case of engines varying nearly with the business) and the difference in the cost of power as used on the revised and the unrevised lines.

The cost of deterioration in the case of either the power or the line, is such an uncertain quantity as to be very hard to arrive at, but it is most certainly no greater for the maximum amount of power required for any given engine division than for deterioration of the road for the same line. Power deteriorates somewhat when out of service for a long time, but this cost may be reduced to a comparatively small amount by alternating the use of the stored and the active power, while on the other hand deterioration of most parts of the line is going on at all times, regardless of the business passing over it.

The saving effected by grade reductions is too often figured at an amount which cannot be obtained under the proposed or any other plan of operation.

Among those items which are commonly given greater weight than experience warrants may be mentioned that of balancing grades for difference in traffic. Where traffic in opposite directions does not differ in an amount exceeding 30 per cent. it is not at all safe to "balance," but at even a considerable additional cost it is well to make all the grades for the 100 per cent., or the heavier, traffic; and this is especially the case where the difference is made up largely of empty cars, the resistance of which is so much greater per ton than that of loaded cars.

Curvature is nothing like so expensive of operation as is generally assumed. A division of 9,000 deg. curvature of a well-known line is now doing so, and has for years past held its own in the matter of operating expenses generally charged to curvature, as compared with other divisions of the same grades, but with much less curvature.

The comparative resistance of two or more lines and the most economical way of overcoming it is, of course, the aim of all comparative figures.

But costs must be determined in terms of operating expenses, and operating expenses do not vary directly with the power exerted to overcome the resistance due grades. When the amount of power exerted is doubled the operating expenses are only increased about one-sixth. It would, therefore, seem that one must be pretty conservative in making allowances for the saving effected in grade and curve reductions as compared with the cost of motive power for effecting the same reduction in operating cost.

Wages of train and engine crews are sometimes misleading, especially so when their basis is not fully understood. It is not safe to figure at so much per train mile, based on apparent existing rates of wages for train and engine crews, as these rates are usually based on the principle that ten hours or less, or 100 miles or less constitute a day's work, and therefore will be the same, even though the line may be shortened considerably. Policy, not miles, makes wage rates.

Engines should be designed to haul the maximum train of a given engine division and be regularly assigned to that territory regardless of the other engine divisions of the system. Incidentally, it may not be amiss to mention the well-known fact that overpowered engines are wholly unnecessary and add greatly to the cost of operation. By designing power, with reference to a particular engine division and with track made up of good strain and wear-resisting rails and other good track materials, much can be done at a reasonable outlay of money to reduce the operating expenses of existing heavy grade lines.

Any scheme of grade revision for a given engine division should be undertaken with the view of completing the whole of an engine division at about the same time, rather than by "piecemeal," otherwise the revised parts will prove unduly expensive pending the completion of the balance, because the



remaining old conditions will not admit of only a part of a revision scheme being operated to its full capacity.

W. L. DERR.

#### NEGLECTED RAILWAY OPPORTUNITIES IN CHINA.

Pittsburgh, May 5, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The more I think about it, the more I wonder why American financiers and manufacturers are not heeding the present changing conditions in China. Are they aware that there is a vast field for railway material and equipment in that market, or, if they are, are there any special impediments that prevent their going into that market?

Continual complaints are now heard and written about the dull times the home makers are having and the idle money seeking propitious investment. Why do they not cast their eyes further into China and see how the events are kaleidoscopically turning? The expectation as to what result the present revision of tariff will bring in their future merely concerns the domestic market and will in no way hinder in the encouragement of the export trade.

The rapid pace with which American industries, particularly those pertaining to railways, have sprung up in the last decade should never be impaired, and in hoping so it is absolutely necessary to keep the exporting channels well drained so as to allow the overflow to take its easier course to foreign markets, such as when dull times overtake the American industries, as at the present.

Much is spoken about the "open door" or "equal opportunity" in this country by rank and file, but where is there evidence that the American manufacturers are trying earnestly to seek that end by actual deed?

Germans, French, English and other European interests are fiercely fighting the battle royal in trying to get the best of each other so as to enlarge their own influence in China, while none of the Americans are in it.

They are building the railways to suit their own ends, supplying engineers and forcing them to build with their own material and equipment. These supplies are not like those edible articles which are consumed daily in a matter-of-fact way and nothing thought of it afterward, but they remain and proceed as the standards for the future. When once they are standardized, however, no matter how the American manufacturers may try to recoup their lost ground, they will be permanently precluded in such an attempt and shut out with high walls for their products.

No far-sighted people can neglect to gage this evinced future, and yet why do they not act? Is it not now high time for the American capitalists and manufacturers to get together and seek some means seriously so as to till the soil and sow the seeds in China, aiming to gather the fruits in future, and simultaneously to relieve the stagnant situation of this country, if only to some degree?

Let us hope that the Americans be not themselves a party in guilt to infringe the "equal opportunity" doctrine in China by their non-action.

K. T. IWASHITA.

#### CONVERSION OF THE NEW CANAAN BRANCH OF THE NEW HAVEN ROAD.

The New Canaan branch of the New York, New Haven & Hartford Railroad, extending from Stamford, on the main line, to New Canaan, 7.66 miles, which was originally operated by steam, was, about ten years ago, equipped with a 500-volt d.c. overhead trolley for passenger service only. About a year ago it was converted into a 11,000-volt a.c. single-phase system. The New Canaan line was particularly suitable for such a change, the expense for overhead construction being comparatively small, as on about 25 per cent. of the route the wires

were carried from the main line overhead bridges. This same construction has been extended over the branch tracks also. Power is supplied through the line from the Cos Cob station, about 11.27 miles from New Canaan.

Direct current operation of the New Canaan branch was discontinued in the latter part of 1907, and the results obtained since the installation of the 11,000-volt, 25-cycle, single-phase catenary has demonstrated the adaptability of this system for branch-line electrification. The overhead line between Glenbrook Junction and New Canaan is carried on wooden poles, 35 ft. high, set 10 ft. from the center line of the track, and spaced 150 ft. tangents. At curves the poles are guyed with plate anchors and  $\frac{3}{8}$ -in. steel strand wire. The bracket is a small 3-in. steel I-beam turned up at the end and braced by a  $\frac{1}{2}$ -in. wrought-iron tension rod, bolted through the pole. The messenger wire,  $\frac{1}{4}$ -in. bare steel strand, is carried on glazed porcelain, double petticoat insulators. The insulators are  $7\frac{1}{2}$  in. in diameter,  $5\frac{1}{2}$  in. high, and protected from the blasts of steam locomotives by an under piece of sheet iron. An auxiliary, No. 0000, steel working conductor is clamped to the No. 0000 copper feeder wire, as on the main line. Hickory steady strands are used on every alternating pole at tangents in addition to their application on curves. The clearance between the trolley and track is 22 ft. The total weight of the catenary construction, which is carried between the I-beam brackets on the tangent bents or spans of 150 ft., is 280 lbs., or about 2 lbs. per foot. The line is anchored at 11 places between Glenbrook and New Canaan. No transformer stations or special transmission wires were necessary on this division, as the pantograph collectors on the cars take current at 11,000 volts.

Section insulators are located at Talmadge Hill, Springdale and the main line junction at Glenbrook. There are also other breakers at Talmadge Hill and Springdale. The sidings normally are dead, being cut in only when necessary. The trip between New Canaan and Stamford is made in from 17 to 20 minutes, and one train ordinarily carries out the schedule.

The overhead line is grounded by No. 0000 iron wire, swung from pole to pole and grounded to the rails at every fifth one. This ground wire constitutes the sole lightning protection. The rails are bonded with No. 0000 bonds.

There are two trains on this division, each composed of one motor car and one trailer. The trailers are of the standard New Haven steam coach design, weighing 35 tons, for ordinary passenger service, and seating 72 passengers. The motor cars are the combination passenger and baggage type, 63 ft. long overall, and seating 52 passengers. Each car is equipped with two American Locomotive Company B-592 trucks, having 36-in. diameter wheels,  $6\frac{1}{2}$ -in. axle and  $5\frac{1}{2}$ -in. x 10-in. journals. Each one carries two GE 603-A, 125 h.p., single-phase motors, operated at a maximum speed of 50 m.p.h. These motors are arranged for multiple unit control. A set of 11 contactors is used with each pair of motors, seven contactors being used for accelerating and four for reserving. The motors are grouped two pairs in parallel, the motors on each track being in series. They are reversed by changing the exciting field connections, and either pair of motors may be cut out in case of trouble. All of the auxiliary circuits are controlled from a switchboard located in the motorman's cab, and power for the control circuit may be taken from either one of the two transformers. These cars are equipped with Westinghouse air brakes and electric heaters, the latter supplied by the Consolidated Car Heating Company, New York.

The Chinese authorities announce the negotiation of a loan with the German-Asiatic Bank for the capital to build a railway over the route formerly conceded to an American syndicate; that is, from Wuchang, opposite Han-kow, southward to Canton, or rather to the border of the province of Kwangtung, where it will be met by a line now under construction which has termini both at Canton and at Kow-lun, in British territory opposite Hong-Kong.

## COMPARATIVE RAIL SPECIFICATIONS.

## The American Railway Association.

## SPECIFICATIONS FOR BESSEMER STEEL RAILS.

The entire process of manufacture and testing shall be in accordance with the best current state of the art, and special care shall be taken to conform to the following instructions:

## 1. Process of Manufacture—

(a) Ingots shall be kept in a vertical position until ready to be rolled, or until the metal in the interior has had time to solidify.

(b) "Bled" ingots shall not be used. ("Bled ingot"—one from the interior of which the liquid steel has been permitted to escape.)

(c) There shall be sheared from the end of the bloom formed from the top of the ingot, sufficient "discard" to insure sound rails. (All metal from the top of the ingot, whether cut from the bloom or the rail, is the "top discard.")

## 2. Chemical Composition—

The chemical composition of the steel from which the rails are rolled shall be within the following limits:

Bessemer Steel Rails.			
	60 lbs.	70 lbs.	80 lbs.
Carbon .....	0.37-0.47	0.40-0.50	0.43-0.53
Manganese .....	0.80-1.10	0.80-1.10	0.80-1.10
Silicon .....	0.10-0.20	0.10-0.20	0.10-0.20
Phosphorus, not to exceed.....	0.10	0.10	0.10
Sulphur, not to exceed .....	0.075	0.075	0.075
90 lbs. 100 lbs.			
Carbon .....	0.45-0.55	0.46-0.56	
Manganese .....	0.85-1.15	0.90-1.20	
Silicon .....	0.10-0.20	0.10-0.20	
Phosphorus, not to exceed.....	0.10	0.10	
Sulphur, not to exceed.....	0.075	0.075	

(When lower phosphorus can be secured, a proper proportionate increase in carbon should be made.)

## 3. Shrinkage—

The number of passes and speed of train shall be so regulated that, on leaving the rolls at the final pass, the temperature of the rails will not exceed that which requires a shrinkage allowance at the hot saws, for a 33-ft. rail of 160 lbs. section, of 6 1-2 in. and 1/4 in. less for each 10 lbs. decrease of section. No artificial means of cooling the steel shall be used between the "leading" and "finishing" passes, nor after the rails leave the finishing rolls; neither shall rails be held before sawing for the purpose of reducing their temperature.

## 4. Drop Test—

The drop testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of 5 inches.

The anvil block shall be adequately supported and shall weigh 20,000 lbs.

The supports shall be a part of or firmly secured to the anvil.

The test piece shall be placed head upward on solid supports, 5 in. top radius, 3 ft. between centers, and subjected to impact tests, the tup falling free from the following heights:

60, 70 and 80-lb. rail.....	16 ft.
90-lb. rail.....	17 ft.
100-lb. rail.....	18 ft.

One drop test shall be made on a piece of rail rolled from the top of the ingot, not less than 4 ft. and not more than 6 ft. long, selected by the inspector from each heat of steel.

(Special or additional tests may be made at the discretion of the inspector.)

The temperature of the test pieces shall be between 32 and 100 deg., Fahrenheit.

(a) If the test piece breaks without showing "pipe," or physical defect, all rails from that heat shall be rejected absolutely.

## Steel Manufacturers of America.

## SPECIFICATIONS FOR STANDARD BESSEMER

## STEEL RAILS FOR A. S. C. E. SECTIONS.

January 1, 1909.

## 1. Chemical Composition—

	50 lbs. up to 60 lbs.	61 lbs. up to 70 lbs.	71 lbs. up to 80 lbs.
Carbon .....	.35-.45	.35-.45	.40-.50
Phosphorus, not over .....	.10	.10	.10
Silicon, not over.....	.20	.20	.20
Manganese .....	.70-1.00	.70-1.00	.75-1.05
	81 lbs. up to 90 lbs.	91 lbs. up to 100 lbs.	
Carbon .....	.43-.53	.45-.55	
Phosphorus, not over.....	.10	.10	
Silicon, not over.....	.20	.20	
Manganese .....	.80-1.10	.84-1.14	

## 2. Shrinkage—

The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass, the temperature of rails of sections 75 lbs. per yard and heavier will not exceed that which requires a shrinkage allowance at the hot saws of 6 7-16 in. for a 33-ft. 75-lb. rail, with an increase of 1/8 in. for each increase of 5 lbs. in the weight of the section.

No artificial means of cooling the steel shall be used after the rails leave the rolls, nor shall they be held before sawing for the purpose of reducing their temperature.

## 3. Drop Test—

One drop test may be made on a piece of rail not less than 4 ft. and not more than 6 ft. long, selected from each blow of steel.

The rails shall be placed head upward on the supports and the various sections shall be subjected to the following impact tests under a free falling weight:

Weights of rail per yard.	Height of drop in feet.
50 to 60 lbs. ....	15
61 to 70 lbs. ....	16
71 to 80 lbs. ....	16
81 to 90 lbs. ....	17
91 to 100 lbs. ....	18

If any rail breaks when subjected to the drop test, two additional tests will be made of other rails from the same blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected; but if both of these additional test pieces meet the requirements all the rail of the blow which they represent will be accepted.

The drop-testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upward on solid supports 3 ft. apart. The anvil block

## American Society of Civil Engineers.

## "RECOMMENDED SPECIFICATIONS FOR BESSEMER STEEL RAILS.

"Process of Manufacture.—The entire process of manufacture and testing shall be in accordance with the best state of the art, and the following instructions shall be faithfully executed:

"Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled, or until the metal in the interior has had time to solidify.

"No bled ingots shall be used.

"There shall be sheared from the end of the blooms formed from the top of the ingots not less than twenty-five per cent., and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does. If, by the use of any improvements in the process of making ingots, the defect known as piping shall be prevented, the above shearing requirements may be modified.

"Chemical Composition.—Rails of the various weights per yard specified below shall conform to the following limits in chemical composition:

	Percentage		
	70 to 79 lbs.	80 to 89 lbs.	90 to 100 lbs.
Carbon .....	0.50-0.60	0.53-0.63	0.55-0.65
Phosphorus, shall not exceed ....	0.085	0.085	0.085
Silicon shall not exceed .....	0.20	0.20	0.20
Sulphur shall not exceed .....	0.075	0.075	0.075
Manganese .....	0.75-1.00	0.80-1.05	0.80-1.05

"The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass, the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws, for a 33-ft. rail of 100-lb. section, of 6 7-16 in., and 1/4 in. less for each 5-lb. decrease of section. These allowances to be decreased at the rate of 1-90 in. for each second of time elapsed between the rail leaving the finishing rolls and being sawn. No artificial means of cooling the steel shall be used after the rails leave the rolls, nor shall they be held before sawing for the purpose of reducing their temperature."

"Drop Test.—One drop test shall be made on a piece of rail, not less than 4 ft. and not more than 6 ft. long, selected from each blow of steel. The test piece shall be taken from the top of the ingot. The rails shall be placed head upward on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

70 to 79-lb. rails.....	18 ft.
80 to 89-lb. rails.....	20 ft.
90 to 100-lb. rails.....	22 ft.

"If any rail breaks, when subjected to the drop test, two additional tests may be made of other rails from the same blow of steel, also taken from the top of the ingots, and if either of these latter rails fail, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

"The drop-testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upward on solid supports 3 ft. apart. The anvil block shall weigh at least 20,000 lbs.,



### American Railway Engineering and Maintenance of Way Association.

#### SPECIFICATIONS FOR BESSEMER STEEL RAILS. STANDARD SPECIFICATIONS.

(1) (a) The entire process of manufacture and testing shall be in accordance with the best current practice, and special care shall be taken to conform to the following instructions:

(b) Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled, or until the metal in the interior has time to solidify.

(c) No bled ingots shall be used.

(d) There shall be sheared from the end of the blooms formed from the top of the ingots not less than twenty-five (25) per cent., and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does. If, by the use of any improvements in the process of making ingots, the defect known as piping shall be prevented, the above shearing requirements may be modified.

(2) Rails of the various weights per yard specified below shall conform to the following limits in chemical composition:

	Percentage		
	70 to 79 lbs.	80 to 89 lbs.	90 to 100 lbs.
*Carbon .....	0.50-0.60	0.53-0.63	0.55-0.65
Phosphorus shall not exceed .....	0.085	0.085	0.085
Silicon shall not exceed .....	0.20	0.20	0.20
Sulphur shall not exceed .....	0.075	0.075	0.075
Manganese .....	0.75-1.00	0.80-1.05	0.80-1.05

\*Carbon may be reduced to suit local conditions.

(5) The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass, the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws for a 33-ft. rail of 100-lb. section of 6.7-16 in., and  $\frac{1}{8}$  in. less for each 5-lb. decrease of section, these allowances to be decreased at the rate of 1.90 in. for each second of time elapsed between the rail leaving the finishing rolls and being sawn. No artificial means of cooling the steel shall be used after the rails leave the rolls, nor shall they be held before sawing for the purpose of reducing their temperature.

(3) One drop test shall be made on a piece of rail not less than 4 ft. and not more than 6 ft. long, selected from each blow of steel. The test piece shall be taken from the top of the ingot. The rails shall be placed head upward on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

70 to 79-lb. rails.....	18 ft.
80 to 89-lb. rails.....	20 ft.
90 to 100-lb. rails.....	22 ft.

If any rail breaks when subjected to the drop test, two additional tests may be made of other rails from the same blow of steel, also taken from the top of the ingots, and if either of these latter rails fail, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

(4) The drop-testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upward on solid supports 3 ft. apart. The anvil block shall weigh at least 20,000 lbs.,

### American Society for Testing Materials

#### PROPOSED STANDARD SPECIFICATIONS.

1. (a) The entire process of manufacture and testing shall be in accordance with the best current practice, and special care shall be taken to conform to the following instructions:

(b) Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled or until the metal in the interior has time to solidify.

(c) No bled ingots shall be used.

(d) There shall be sheared from the end of the blooms formed from the top of the ingots not less than  $x$  %,† and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does.

†The percentage of minimum discard in any case to be subject to agreement, and it should be recognized that the higher this percentage the greater will be the cost.

2. Rails of the various weights per yard specified below shall conform to the following limits in chemical composition:

	Percentage			
	Carbon.	Phosphorus, shall not exceed.	Silicon, shall not exceed.	Manganese.
50 to 59 lbs....	0.35-0.45	0.10	0.20	0.70-1.00
60 to 69 lbs....	0.38-0.48	0.10	0.20	0.70-1.00
70 to 79 lbs....	0.40-0.50	0.10	0.20	0.75-1.05
80 to 89 lbs....	0.43-0.53	0.10	0.20	0.80-1.10
90 to 100 lbs....	0.45-0.55	0.10	0.20	0.80-1.10

4. The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws for a 33-ft. rail of 100-lb. section of 7.5-16 in., and  $\frac{1}{8}$  in. less for each 5-lb. decrease of section. These allowances to be decreased at the rate of 0.01 in. for each second of time elapsed between the rail leaving the finishing rolls and being sawed. No artificial means of cooling the rails shall be used between the finishing pass and the hot saws.

3. One drop test shall be made on a piece of rail not less than 4 ft. and not more than 6 ft. long, selected from every fifth blow of steel. For rails weighing 85 to, and including, 100 lbs. per yard, one drop test shall be made from every blow of steel. The test shall be taken from the top of the ingot. The rail shall be placed head upwards on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

Weight of rail, pounds per yard.	Height of drop, feet.
45 to and including 55	15
More than 55 to and including 65	16
More than 65 to and including 75	17
More than 75 to and including 85	18
More than 85 to and including 100	19

If any rail breaks when subjected to the drop test, two additional tests, taken from the top of the ingot, will be made of other rails from the same blow of steel, and if either of these latter tests fails, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

### Comments.

*Process of Manufacture.*—Omitted in Manufacturers' Specification; practically the same in other four except per cent. of discard to remove piping; is now in general practice, merely a matter of price when greater than the customary discard is required.

*Chemical Composition.*—Chemical requirements for 100-lb. rail:

	Carbon.	Manganese.
American Ry. Assn. ....	.46 to .56	.90 to 1.20
Manufacturers .....	.45 to .55	.84 to 1.14
A. S. C. E. ....	.55 to .65	.80 to 1.05
M. of W. ....	.55 to .65	.80 to 1.05
Am. Sy. T. M. ....	.45 to .55	.80 to 1.10

	Silicon.	Phosph.	Sulph.
American Ry. Assn. ....	.10 to .20	.10	.075
Manufacturers .....	.20 max.	.10	..
A. S. C. E. ....	.20 "	.085	.075
M. of W. ....	.20 "	.085	.075
Am. Sy. T. M. ....	.20 "	.10	..

*Shrinkage.*—Shrinkage for 100-lb. rail in 33 ft.:

A.R.A. Mfrs.	A. S. C. E.	M. of W.	A. S. T. M.
6½ in.	6¾ in.	6⅞ in.	7⅞ in.

The manufacturers have made concessions on this point, and their allowance of 6¾ in. is now practically within the permissible variation of ¼ in. in length, and it would seem as though 6½ in. should be satisfactory to all.

*Drop Test.*—The American Railway Association and Manufacturers' specifications call for 18 ft. drop on 100-lb. rail. The American Society of Civil Engineers and the American Railway Engineering and Maintenance of Way Association call for 22 ft. and the American Society for Testing Materials for 19 ft. The drop-testing machine has been standardized, and it is claimed that the lower drop of 18 ft. called for under the new conditions is equivalent to the higher drop of 22 ft. previously specified. All the specifications except the Manufacturers' provide for the test piece to be taken from the top of ingot. The Manufacturers provide for the test piece to be selected from each blow of steel, which would permit the inspector to take it from the top of ingot if he desired. All specifications provide for drop test to be made from each heat of steel.

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(b) If, however, the test piece broken shows "pipe," or physical defect, the top rail from each ingot of that heat shall be rejected, and

(c) A second test shall then be made of a test piece selected by the inspector from a rail other than that from the top of the ingot. If this second piece breaks, the remainder of the rails of the heat shall also be rejected. If this second piece does not break, the remainder of the rails of the heat will be accepted.

If the test piece does not break under the drop test, it shall then be tested to destruction, and

(d) If, when so tested to destruction, the test piece shows "pipe," or physical defect, the top rail from each ingot shall be rejected; the remainder of the rails of the heat will be accepted.

(e) If, when so tested to destruction, the test piece does not show "pipe," or physical defect, all the rails of the heat will be accepted.

5. *Section.*—The section of rail shall conform to the template furnished by the purchaser as accurately as possible consistent with the paragraph relative to specified weight.

An excess of  $\frac{1}{8}$  inch in height of rails, and a variation of  $\frac{1}{16}$  inch in width of flange will be permitted, but no variations will be allowed in dimensions affecting the fit of splice bars.

6. *Weight.*—The weight of the rail shall be maintained as nearly as possible, after complying with the preceding paragraph, to that specified in the contract.

A variation of one-half of one per cent. from the calculated weight of section, on an entire order, will be allowed.

Rails will be accepted and paid for according to actual weight.

7. *Length.*—The standard length of rails shall be 33 feet. Ten per cent. of the entire order will be accepted in shorter lengths varying as follows: 30 feet, 28 feet, 26 feet and 24 feet. A variation of  $\frac{1}{4}$  inch from the specified length will be allowed.

All No. 1 rails less than 33 feet long shall be painted green on both ends.

8. *Drilling.*—Circular holes for splice bars shall be drilled in accordance with specifications of the purchaser. They shall in every respect conform accurately to drawing and dimensions furnished and must be free from burrs.

9. *Straightening.*—Care must be taken in hot-straightening rails, and it must result in their being left in such condition that they shall not vary throughout their entire length more than *three (3) in.* from a straight line in any direction when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second quality rails and be so marked. *Rails while on the "hot" beds shall be protected from coming in contact with water or snow.* The distance between supports of rails in the gagging press shall not be less than forty-two (42) inches; supports to have flat surfaces. Rails shall be straight in line and surface and smooth on head when finished—final straightening being done while cold. They shall be sawed square at ends, variations to be not more than  $\frac{1}{16}$  inch, and prior to shipment shall have the burr caused by the saw cutting removed and the ends made clean.

10. *Branding.*—The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters and figures on the side of the web. The number of the heat and a letter indicating the portion of the ingot from which the rail was made shall be plainly stamped on the web of each rail, where it will not be covered by the splice bars. *Rails to be lettered con-*

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shall weigh at least 20,000 lbs., and the supports shall be part of, or firmly secured to the anvil. The report of drop test shall state the atmospheric temperature at the time the test was made. The temperature of the test pieces, when tested, shall be not less than 60 deg. F. or greater than 120 deg. F. The testing shall proceed concurrently with the operation of the mill.

(4) *Section.*—The section of rail shall be that recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the Railroad Company, consistent with Clause No. 5, relative to specified weight. An allowance in height of  $\frac{1}{64}$  of an inch under, and  $\frac{1}{32}$  of an inch over and in width of  $\frac{1}{8}$  inch will be permitted. A perfect fit of the splice bars shall be maintained.

(5) *Weight.*—The weight of the rails shall be maintained as nearly as possible, after complying with clause No. 4, to that specified in contract. A variation of  $\frac{1}{2}$  of 1 per cent. for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

(6) *Length.*—The standard length of rails shall be 30 or 33 feet. Ten per cent. of the entire order will be accepted in shorter lengths, varying by even feet down to 24 feet. A variation of  $\frac{1}{4}$  of an inch in length from that specified will be allowed.

Both ends of all short length No. 1 Rails shall be painted green.

(8) *Drilling.*—Circular holes for Splice Bars shall be drilled in accordance with specifications of purchaser. They shall in every respect accurately conform to drawing and dimensions furnished and shall be free from burrs.

(9) *Finishing.*—Rails shall be carefully hot-straightened so as not to vary, throughout their entire length, more than 5 inches from a straight line in any direction when delivered to the cold straightening presses. Those which vary beyond that amount or have short kinks shall be classed as No. 2 Rails and shall be so stamped. The distance between supports of rails in the gagging press shall not be less than 42 inches. Rails shall be straight in line and surface when finished—the final straightening being done while cold—smooth on head, sawed square at ends—variations therefrom to be not more than  $\frac{1}{16}$  inch—and prior to shipment, shall have the burr caused by the saw cutting removed and the ends made clean.

(7) *Branding.*—The name of the maker, the weight of the rail and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of the heat shall be so stamped on each rail as not to be covered by the splice bars. A letter shall be stamped on the side of the web to indicate the portion of the ingot from which the rail was rolled.

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the supports shall be part of, or firmly secured to, the anvil. The report of the drop test shall state the atmospheric temperature at the time the test was made."

"*Section.*—The section of rail shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with the paragraph relative to specified weight. A variation in height of 1-64 in. less, or 1-32 in. greater than the specified height, and 1-16 in. in width will be permitted. The section of rail shall conform to the finishing dimensions.

"*Weight.*—The weight of the rails will be maintained as nearly as possible, after complying with the preceding paragraph, to that specified in contract. A variation of one-half of 1 per cent. for an entire order will be allowed. Rails will be accepted and paid for according to actual weights.

"*Length.*—The standard length of rails shall be 33 ft. Ten per cent. of the entire order will be accepted in shorter lengths varying by even feet to 27 ft., and all No. 1 rails less than 33 ft. long shall be painted green on the ends. A variation of  $\frac{1}{4}$  in. in length from that specified will be allowed.

"*Drilling.*—Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall conform accurately to the drawing and dimensions furnished, in every respect, and must be free from burrs.

"*Straightening.*—Care must be taken in hot-straightening the rails, and it must result in their being left in such condition that they shall not vary throughout their entire length more than 5 in. from a straight line in any direction, when delivered to the cold straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second-quality rails and be so stamped.

"Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variation to be not more than  $\frac{1}{16}$  in., and, prior to shipment shall have the burr occasioned by the saw cutting removed, and the ends made clean.

"*Branding.*—The name of the maker, the weight of the rail, and the month and year of manufacture, shall be rolled in raised letters on the side of the web; and the number of the blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.



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and the supports shall be part of, or firmly secured to, the anvil. *The report of the drop test shall state the atmospheric temperature at the time the test was made.*

(7) Unless otherwise specified, the section of rail shall be the American standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with paragraph No. 8, relative to specified weight. A variation in height of one sixty-fourth (1-64) inch less, or one thirty-second (1-32) inch greater than the specified height, and one-sixteenth (1-16) inch in width, will be permitted. The section of rail shall conform perfectly to the finishing dimension.

(8) The weight of the rails will be maintained as nearly as possible, after complying with paragraph No. 7, to that specified in contract. A variation of one-half ( $\frac{1}{2}$ ) of one per cent. for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

(9) The standard length of rails shall be 33 ft. Ten per cent. of the entire order will be accepted in shorter lengths, varying by even feet to 27 ft., and all No. 1 rails less than 33 ft. shall be painted green on the end. A variation of one-fourth of an inch in length from that specified will be allowed.

(10) Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawings and dimensions furnished in every respect, and must be free from burrs.

(11) Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variation to be not more than  $\frac{1}{8}$  in., and, prior to shipment, shall have the burr occasioned by the saw cutting removed and the ends made clean.

(12) Care must be taken in hot-straightening the rails, and it must result in their being left in such a condition that they shall not vary throughout their entire length of 33 ft. more than  $\frac{3}{16}$  in. from a straight line in any direction, when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second quality rails and be so stamped. The distance between supports of rails in the gagging press shall not be less than 42 in.

(13) The name of the maker, the weight of rail and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.

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5. The drop-testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upwards on solid supports 3 ft. apart. The anvil block shall weigh at least 20,000 lbs., and the supports shall be part of, or firmly secured to, the anvil. *The report of the drop test shall state the atmospheric temperature at the time the test was made.*

(7) Unless otherwise specified, the section of rail shall be the American standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with Paragraph No. 8, relative to specified weight. A variation in height of 1-64 of an inch less, or 1-32 of an inch greater than the specified height, and 1-16 in. in width will be permitted.

(8) The weight of the rails will be maintained as nearly as possible, after complying with Paragraph No. 7, to that specified in contract. A variation of one-half of 1 per cent. for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

(9) The standard length of rails shall be 33 ft. Ten per cent. of the entire order will be accepted in shorter lengths, varying by even feet to 27 ft., and all No. 1 rails less than 33 ft. shall be painted green on the end. A variation of one-fourth of an inch in length from that specified will be allowed.

(10) Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawing and dimensions furnished in every respect, and must be free from burrs.

(11) Care must be taken in hot-straightening the rails, and it must result in their being left in such a condition that they shall not vary throughout their entire length more than  $\frac{5}{16}$  in. from a straight line in any direction when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second quality rails and be so stamped. The distance between supports of rails in the gagging press shall not be less than 42 in. Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variations to be not more than  $\frac{1}{8}$  in., and, prior to shipment, shall have the burr occasioned by the saw cutting removed and the ends made clean.

(12) The name of the maker, the weight of rail and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.

### Comments.

**Section.**—American Railway Association specify their own sections. Manufacturers specify A. S. C. E. sections. Others say A. S. C. E. sections unless otherwise specified. All other requirements the same.

**Weight.**—Same requirements in all cases.

**Length.**—All provide for 33 ft. lengths and  $\frac{1}{4}$  in. variation in length. Other requirements practically the same.

**Drilling.**—Same requirements in all cases.

**Straightening.**—Limits of variation out of line in 33 ft. rail before cold straightening: American Ry. Assn. and American Ry. E. & M. W. Assn. specify 3 in., the others 5 in. Other requirements practically the same. American Railway Assn. specifies that rails while on the hot beds shall be protected from coming in contact with water or snow. This provision will no doubt become universal as its importance is self-apparent.

**Branding.**—The American Railway Association and Manufacturers specifications provide that each rail shall be marked consecutively "A," "B," "C," etc., to indicate its position in the ingot. Others do not have this requirement but will adopt it as it has come into general practice. The American Railway Association provides that with discard of 20 per cent. or more, the letter "A"—representing the top of the ingot, will be omitted.

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respectively "A," "B," "C," etc., the rail from the top of the ingot being "A." In case of a top discard of twenty or more per cent., letter "A" will be omitted. All rails marked "A" shall be kept separate and be shipped in separate cars.

11. No. 1 Rails.—No. 1 rails shall be free from injurious defects and flaws of all kinds.

12. No. 2 Rails.—Rails which, by reason of surface imperfections, are not classed as No. 1 rails, shall be considered No. 2 rails, but No. 2 rails shall not be accepted for shipment which have flaws in the head of more than 1-8 inch, or in the flange of more than 1-4 inch in depth, and these shall not, in the judgment of the Inspector, be, in any individual rail, so numerous or of such a character as to render it unfit for recognized No. 2 rail uses.

Both ends of No. 2 rails shall be painted white, and shall have two prick punch marks on the side of the web near the end of the rail, so placed as not to be covered by the splice bars. They must be kept separate from No. 1 rails and be shipped in separate cars.

13. Inspection.—(a) Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the rails have been made in accordance with the terms of the specifications.

(b) The manufacturer shall, before the rails are shipped, furnish the Inspector daily with carbon determinations for each heat, and a complete chemical analysis every 24 hours representing the average of the other elements contained in the steel for each day and night turn. These analyses shall be made on drillings taken from small test ingots. The drillings for analysis shall be taken from the ladle test ingot at a distance of 1-4 inch beneath the surface.

(c) All tests and inspection shall be made at the place of manufacture prior to shipment, and so conducted as not to interfere unnecessarily with the operation of the mill. On request of the Inspector the manufacturer shall furnish drillings for check analysis.

**The American Railway Association.****SPECIFICATIONS FOR OPEN-HEARTH STEEL RAILS.**

These specifications for Open-Hearth Steel Rails are exactly the same as those for Bessemer Steel Rails—given above—with the following exceptions:

2. Chemical Composition.—The chemical composition of the steel from which the rails are rolled shall be within the following limits:

	Open-Hearth Steel Rails.		
	60 lbs.	70 lbs.	80 lbs.
Carbon .....	0.50-0.60	0.55-0.65	0.60-0.70
Manganese .....	0.75-1.00	0.75-1.00	0.75-1.00
Silicon .....	0.10-0.20	0.10-0.20	0.10-0.20
Phosphorus, not to exceed .....	0.04	0.04	0.04
Sulphur, not to exceed .....	0.06	0.06	0.06
90 lbs. 100 lbs.			
Carbon .....	0.65-0.75	0.70-0.80	
Manganese .....	0.75-1.00	0.75-1.00	
Silicon .....	0.10-0.20	0.10-0.20	
Phosphorus, not to exceed .....	0.04	0.04	
Sulphur, not to exceed .....	0.06	0.06	

(When higher phosphorus is used, a proper proportionate reduction in carbon should be made.)

10. Branding.—All open-hearth rails must be marked O. H. to distinguish them from Bessemer rails when in track. The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters and figures on the side of the web. The number of the heat and a letter indicating the portion of the ingot

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No. 1 Rails shall be free from injurious defects and flaws of all kinds.

(11) No. 2 Rails.—Rails which by reason of surface imperfections are not classed as No. 1 Rails shall be considered No. 2 Rails; but No. 2 Rails shall not be accepted for shipment which have flaws in the head of more than 1-4 inch; or in the flange of more than 1-2 inch in depth; and these shall not, in the judgment of the Inspector, be, in any individual rail, so numerous or of such a character as to render it unfit for recognized No. 2 Rail uses.

(12) Designation of No. 2 Rails.—Both ends of all No. 2 Rails shall be painted white.

(10) Inspection.—The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times while his contract is being executed, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the rails are being made in accordance with the terms of the contract. All tests and inspection shall be made at the place of manufacture prior to shipment, and shall be so conducted as not to unnecessarily interfere with the operation of the mill. The manufacturer shall furnish the inspector, daily, with carbon determinations of each heat, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel for each day and night turn. Analyses shall be made on drillings taken from small test ingots, the drillings being taken at a distance of not less than 1-4 inch beneath the surface of said test ingots. On request of the inspector the manufacturer shall furnish drillings for check analysis.

**Steel Manufacturers of America.****SPECIFICATIONS FOR STANDARD OPEN-HEARTH STEEL RAILS FOR A. S. C. E. SECTIONS.**

January 1, 1909.

These specifications for Open-Hearth Steel Rails are exactly the same as those for Bessemer Steel Rails—given above—with the following exceptions.

(1) Chemical Composition—

	50 lbs. up to 60 lbs.	61 lbs. up to 70 lbs.	71 lbs. up to 80 lbs.
	0.46-0.59	0.46-0.59	0.52-0.65
Carbon .....	0.46-0.59	0.46-0.59	0.52-0.65
Phosphorus, not over .....	0.04	0.04	0.04
Silicon, not over .....	0.20	0.20	0.20
Manganese .....	0.60-0.90	0.60-0.90	0.60-0.90
81 lbs. 91 lbs.			
Carbon .....	0.59-0.72	0.62-0.75	
Phosphorus, not over .....	0.04	0.04	
Silicon, not over .....	0.20	0.20	
Manganese .....	0.60-0.90	0.60-0.90	

(7) Branding.—The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of the heat and the letters O. H. (to designate the grade of steel) shall be so stamped on each rail as not to be covered by the splice bars. If desired, a letter

**American Society of Civil Engineers.**

No. 1 rails shall be free from injurious defects and flaws of all kinds.

"No. 2 rails shall be accepted up to 5 per cent. of the whole order. They shall not have flaws in their heads of more than 1-4 in., or the flange of more than 1-2 in. in depth, and, in the judgment of the inspector, these shall not be so numerous or of such a character as to render them unfit for recognized second-quality rail uses. The ends of No. 2 rails shall be painted white, and shall have two prick-punch marks on the side of the web near the heat number brand, and placed so as not to be covered by the splice bars. Rails from heats which failed under the drop-test shall not be accepted as No. 2 rails.

"Inspection.—The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment.

"The manufacturer shall furnish the inspector, daily, with carbon determinations for each blow and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from small test ingots. On the request of the inspector, the manufacturer shall furnish drillings for check analyses.

**American Society of Civil Engineers.****SPECIFICATIONS FOR BASIC OPEN-HEARTH STEEL RAILS.**

The specifications for rails made by the Basic Open-Hearth process shall be the same as for Bessemer rails, excepting that a full chemical determination shall be furnished for each heat and two drop-tests from each. Their chemical composition shall be:

	Per cent.		
	70 to 79 lbs.	80 to 89 lbs.	90 to 100 lbs.
Carbon .....	0.53-0.63	0.58-0.68	0.65-0.75
Phosphorus, shall not exceed .....	0.05	0.05	0.05
Silicon, shall not exceed .....	0.20	0.20	0.20
Sulphur, shall not exceed .....	0.06	0.06	0.06
Manganese .....	0.75-1.00	0.80-1.05	0.80-1.05



American Railway Engineering and  
Maintenance of Way Association.

## American Society for Testing Materials

## Comments.

No. 1 rails shall be free from injurious defects and flaws of all kinds.

(15) No. 2 rails will be accepted up to five (5) per cent. of the whole order. Rails that possess any injurious defects, or which for any other cause are not suitable for first quality, or No. 1 rails, shall be considered as No. 2 rails; provided, however, that rails which contain any physical defects which impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them. Rails rejected under the drop test will not be accepted as No. 2 rails.

(14) The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment.

(6) The manufacturer shall furnish the inspector daily with carbon determinations for each blow, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from small test ingots.

American Railway Engineering and  
Maintenance of Way Association.

## SPECIFICATIONS FOR BASIC OPEN-HEARTH RAILS.

The specifications for rails made by the basic open-hearth process shall be the same as for Bessemer rails, excepting that their chemical composition shall be:

	Per cent.		
	70 to 79 lbs.	80 to 89 lbs.	90 to 100 lbs.
Carbon .....	0.63-0.73	0.68-0.78	0.75-0.85
Phosphorus, shall not exceed....	0.03	0.03	0.03
Silicon .....	.075-0.20	.075-0.20	.075-0.20
Sulphur, shall not exceed .....	0.06	0.06	0.06
Manganese, shall not exceed....	0.90	0.90	0.90

The Committee on Rail has under consideration the matter of revised specifications.

No. 1 rails shall be free from injurious defects and flaws of all kinds.

(15) No. 2 rails will be accepted to at least five (5) per cent. of the whole order. Rails that possess any injurious defects, or which for any other cause are not suitable for first quality, or No. 1 rails, shall be considered as No. 2 rails; provided, however, that rails which contain any physical defects which impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them. Rails rejected under the drop test will not be accepted as No. 2 rails.

13. The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

6. The manufacturer shall furnish the inspector, daily, with carbon determinations for each blow, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from a small test ingot.

## American Society for Testing Materials.

Committee A on Standard Specifications for Iron and Steel has under consideration the matter of standard specifications for open-hearth steel rails.

No. 1 Rails.—Same requirements in all cases.

No. 2 Rails.—The American Railway Association specifies the limit of flaws  $\frac{1}{8}$  in. deep in head and  $\frac{1}{4}$  in. in flange. The Manufacturers and American Society of Civil Engineers specify flaws  $\frac{1}{4}$  in. deep in head and  $\frac{1}{2}$  in. deep in flange. American Railway Engineering and Maintenance of Way Association and American Society for Testing Materials specify that only such defects will be accepted which do not impair the strength of the rail.

American Railway Association and the Manufacturers and A. S. C. E. specify that two center punch marks shall be put on each No. 2 rail.

American Railway Association, the American Society of Civil Engineers, the American Railway Engineering and Maintenance of Way Association and the American Society for Testing Materials will not accept rails as No. 2 from heats which failed under the drop test; Manufacturers have no such provision.

Inspection.—American Railway Association and Manufacturers' specifications provide that the drillings for analysis shall be taken  $\frac{1}{4}$  in. beneath the surface. Would it not be desirable to have this requirement appear in all specifications?

Chemical Composition.—Chemical requirements for 100-lb. rails:

	Carbon.	Manganese.
American Ry. Assn....	.70 to .80	.75 to 1.00
Manufacturers .....	.59 to .72	.60 to .90
A. S. C. E. ....	.65 to .75	.80 to 1.05
A. R. E. and M. W. A. .	.75 to .85	.90 max.

	Silicon.	Phosph.	Sulph.
Amer. Ry. Assn....	.10 to .20	.04	.06
Manufacturers ....	.20 max.	.04	.06
A. S. C. E. ....	.20 max.	.05	.06
A. R. E. & M. W. A. .	.075 to .20	.03	.06

A. S. T. M.—Considering open-hearth specifications.

Branding.—The American Railway Association and Manufacturers' specifications provide that each rail shall be marked consecutively "A," "B," "C," etc., to indicate its position in the ingot. Others do not have this requirement, but will adopt it, as it has come into general practice.

The American Railway Association provides that with discard of 20 per cent. or more the letter "A," representing the top of the ingot, will be omitted.

The American Railway Association and Manufacturers call for each rail to be marked Q. H. to designate quality.

Inspection.—American Railway Association and Manufacturers' specifications provide that the drilling for analysis shall be taken  $\frac{1}{4}$  in. beneath the surface. Would it not be desirable to have this requirement appear in all specifications?

American Railway Association and Manufacturers' specifications provide that the inspector shall be furnished with complete chemical determinations for each heat of steel. This requirement will no doubt become universally adopted.

**The American Railway Association.**

from which the rail was made, shall be plainly stamped on the web of each rail, where it will not be covered by the splice bars. Rails to be lettered consecutively "A," "B," "C," etc., the rail from the top of the ingot being "A." In case of a top discard of twenty or more per cent., letter "A" will be omitted. All rails marked "A" shall be kept separate and be shipped in separate cars.

**18. Inspection.**—Requirements same as for Bessemer except—"The Manufacturer shall, before the rails are shipped, furnish the inspector with a complete chemical determination for each heat.

**Steel Manufacturers of America.**

shall be stamped on the side of the web to indicate the portion of the ingot from which the rail was rolled.

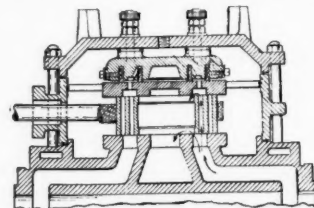
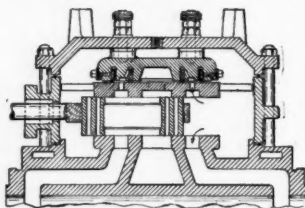
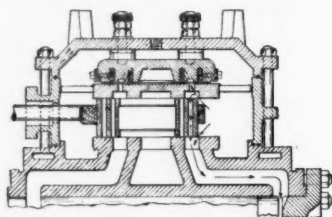
**Inspection.**—Requirements same as for Bessemer except—"The Manufacturer shall furnish the inspector a chemical analysis of each heat of steel covering the elements specified.

**AMERICAN BALANCED VALVES.**

The American Balanced Valve Co., of Jersey Shore, Pa., has put out two designs of balanced valves that possess a number of interesting features, from the standpoint both of technical and of practical efficiency. One is a flat slide and the other a piston valve.

The slide valve is a modification of the one that has been used for some time, but possesses the added advantage of an increase of balance ratio, which, through changing, is raised to the highest practicable when the valve is in its central position under a wide-open throttle. In order to show just what changes have been made, the older design is illustrated. In this, the upper face of the valve plate is divided into two parts by the packing strips above, and each of these has an opening down through the plate to the valve space beneath. They are so arranged as to be in communi-

to the number of square inches so enclosed. This area is made as large as it is possible to use when the valve is in the central position and not cause it to leave its seat. The valve is, therefore, balanced to as great an extent as possible and still have load enough upon it to maintain a steam-tight joint at its face. If, now, the valve be moved to the position where it is just beginning to admit steam to the cylinder port, or just cutting off steam for expansion, there is a condition where the cylinder is full of steam at steam chest pressure which is exerting an upward thrust on the face of the valve equal to the area of the steam port. If this upward pressure on the face of the valve were not to be counteracted, the valve would, of course, be lifted from its seat, since the valve, being fully balanced in its central position, would not stand this increase of balance by the development of greater pressure in the port, and it would consequently be lifted from its seat. To meet this difficulty, it has, heretofore, been



Older Design of American Slide Valve.

cation with the proper steam space. As there is no packing between the valve and the plate the downward pressure of the latter is depended upon to keep the rubbing surfaces in contact and tight, and it must be kept balanced. Taking up the movement in detail when the valve is in the opening position as shown, the exhaust steam pressure passes up through the port at the right and acts on that end of the plate, thus balancing that, and live steam does the same at the left. This also holds during the balance of the stroke, as indicated by the engraving showing the valve in the wide-open position, and until the exhaust opens, when the pressure on top of the valve plate is relieved and drops to that of the exhausted steam.

With the new arrangement the same principle is used with a variation in detail by which a better balance is obtained at maximum points. Instead of splitting the upper surface of the valve plate into two areas, it is divided into three, of which the central one is always in communication with the exhaust while the two at the ends are alternately filled with live steam according to the movement of the valve and the necessities of the case. First, then, it will be seen that the balanced area is changeable, and that there is but one change with each stroke of the valve. By referring to the section of the valve in its central position, which is the heaviest, if there were no balance the valve would be subjected to a pressure on its back equivalent to the entire surface of its face multiplied by the steam chest pressure. The use of the balance strips enclosing the area A by C prevents the live steam of the steam chest from gaining access to this area, and thus reduces the pressure on the valve seat in proportion

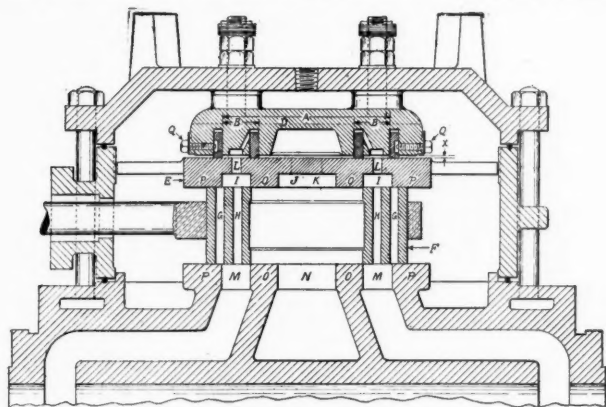
customary to leave a valve underbalanced in its central position.

In this valve, the pressure in the port is counteracted by allowing the steam to have access to the top of the valve through the ports in the same, so that the pressure is at all times the same on both faces of the valve. The port pressure does not, therefore, affect the valve, but since the valve plate lies loosely on the back of the valve, and the cylinder port pressure passes through the valve to the pocket port in the face of the valve plate, it would lift the latter away from the valve, unless there was an opening by which it could pass to the other side, and fill an equal area to that of the port. To permit of this the smaller space with a width of B and a length of C is enclosed by the packing strips at the back of the valve plate and is always open to the port pressure. It will now be clear that when the valve is unbalanced by the pressure in the cylinder port, the valve plate is simultaneously unbalanced by the same pressure entering the space between the packing strips. That the action should be automatic is insured by having one of these areas over each port, which acts with its own port only.

As the valve moves on in its travel and reaches the end of its stroke and the wide-open position, the change in balance that would be caused by the over-travel beyond the edge of the seat is neutralized by having the valve travel out from under the upper seat or valve plate at the same time and to the same extent that it travels over the lower seat, so that the over-travel is taken care of automatically in the balance. At the other end the steam is admitted to the space above and corresponding to the cylinder port, so that the conditions



of balance of the valve plate remain unchanged from the time of the commencement of the opening of the port for steam admission. Furthermore, the valve seat is so proportioned that the valve will travel to the edge of the same when the engine is working at its shortest possible cut-off. With this proportion fixed, any desired valve travel can be used, and at the same time a uniform frictional contact of the valve and seat be maintained, and that with but one change in the balanced area, which will meet all of the requirements from the central position to the full limit of over-travel. To summarize the matter, the feature of the valve is that there is as large an area of balance as possible in the central position

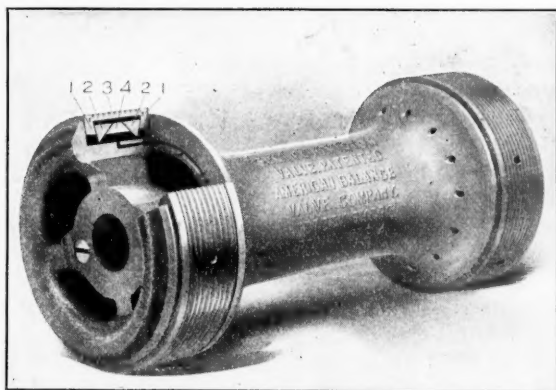


American Flat Slide Valve.

and two small areas in the interior of it, to which steam is admitted to counteract the lifting tendency of the steam beneath the valve in the steam ports.

A modification of the rigid automatic balanced piston valve has also been brought out by the same company. It is called a semi-plug valve, because, while it is without steam, it is a snap ring valve, that is, the packing rings are expansible and fit themselves to the valve chamber; but, when the throttle is opened, the steam is admitted to the chest to enter the space below the rings, and the action of this pressure is to lock the snap rings to a fixed diameter, practically making a plug of it during the time the pressure is on.

The outside walls of the snap rings (1) are straight and fit against the straight wall of the follower and spool. The



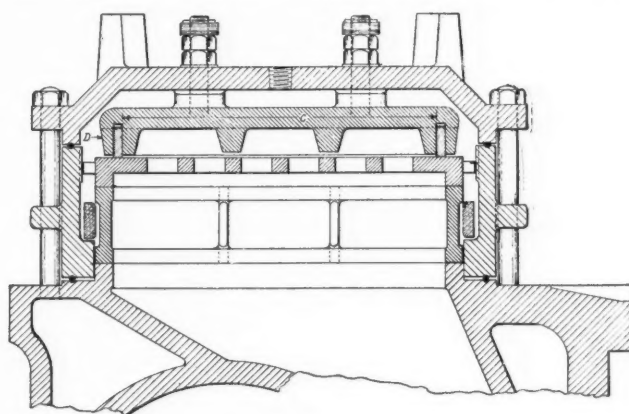
American Semi-Plug Piston Valve.

inner walls of these snap rings are beveled, forming a cone. Next to the snap rings are the wall rings (2), the sides of which are beveled to fit the cones of the snap rings. These are called wall rings because they form the inner walls of the snap rings. They are uncut, non-expansible steel rings. Between these wall rings there is placed a double-coned expansible ring called a wedge ring (4), which, with the wide ring (3) interlocked into each snap ring, forms the complete packing.

The wide ring performs two important functions: First, it carries the snap ring across ports while drifting, and, second,

the wide ring holds the snap rings parallel to each other.

The operation of the packing is as follows: The wedge ring (4) is put in place under tension, so that it has a tendency to crowd the two solid wall rings laterally against the coned sides of the snap rings. This prevents the lateral wear of all rings. It will be observed that the angle of taper of the cones is much greater on the wedge than on the snap rings, and this is so arranged that the leverage of the double-tapered wedge ring crowding the solid wall rings against the cones of the snap rings is just sufficient to prevent the snap rings from any further expansion, but not sufficient to reduce their diameter. As the frictional contact of the snap rings



against the walls of the valve chamber depends on the angles of these cones, it is evident that it can be varied to meet the requirements of the case.

When steam is admitted to the valve it passes through a number of small holes around the spool and enters beneath the snap ring, insuring its fit in the chamber, and then, by pressing out against the wedge ring, puts it in position to lock the snap rings. As the packing is free to move up and down in the piston groove there is always a fit, regardless of the position of the spool.

It is, therefore, evident that the snap rings will remain at the diameter of the cage at which they happen to be locked, unless it occurs that they are locked at a large diameter, when they will be crowded back to the smallest by the movement of the valve, and then they will remain at that diameter. So that there is no tendency to wear the chamber unevenly.

The valves are made for both external and internal admission, and the valve is used as a reversing gear by changing the steam from external to internal admission.

It is not intended that these valves shall bear against the bottom of the valve chamber, as that would distort the position of the packing on the spool and tend to produce uneven wear, but that they should be carried by the valve rod or other means, so that all of the work demanded of the packing will be that of maintaining a steam-tight joint.

#### STORAGE GRAIN ELEVATOR.

A reinforced concrete storage grain elevator has just been built at Baltimore, Md., for the Baltimore & Ohio by James S. Stewart & Co., contractors. No wood whatever was used. The capacity is 250,000 bushels, divided up into 130 bins, varying in size from 1,000 to 3,000 bushels, but most of them are of the smaller capacity. The bins are rectangular and have concrete walls varying in thickness. The thickest ones are 8 in. and the thinnest are 6 in. All are reinforced, both horizontally and vertically, by open-hearth, round steel bars; the horizontal bars are placed 1½ in. from each side of the wall and are figured to resist the bending stresses of the grain pressure. The corners of the bins are reinforced with large fillets, which provide for the concentrated loads on the cupola. The bin bottoms are hoppers above the concrete slab, which,

in turn, rests upon the concrete girders, the larger ones being 3 ft. wide x 6 ft. deep. The main columns of the basement, first and second story, are 42-in. octagons and are reinforced by spiral steel hoops and vertical steel bars.

The concrete mixture was as follows: All walls, 1-3-5; floor slabs, 1-2.5-4; cornice and projections, 1-2-3. A Smith mixer No. 2½ was used, and Northampton, Dexter, Universal and Dragon cements were employed. The concrete was not water-proofed.

The foundation consists of a single, enormous concrete slab, extending over the entire area and projecting several feet beyond the building line of the elevator. To get on firm ground, which runs in strata on an incline, it was necessary to step the footings off from one corner to the diagonally opposite corner, increasing the thickness from about 6 ft. to nearly 15 ft. This footing is reinforced by steel bars running in both directions under the columns on the top and bottom planes.

Wooden forms were used in all the work, and these were very heavy and well braced, owing to the heavy monolithic construction throughout. They were wet well before the concrete was poured. A set of movable forms were used in molding the bins, and they formed an interesting feature of

ribbed glass. The interior doors are kalsomined and the exterior doors are corrugated galvanized steel of the roller type, provided with chain mechanism.

The elevator machinery is driven by Westinghouse 60-cycle, 440-volt, a. c. motors, and the elevator is lighted by electricity. There is a dust-collecting system and complete lines of steel spouting.

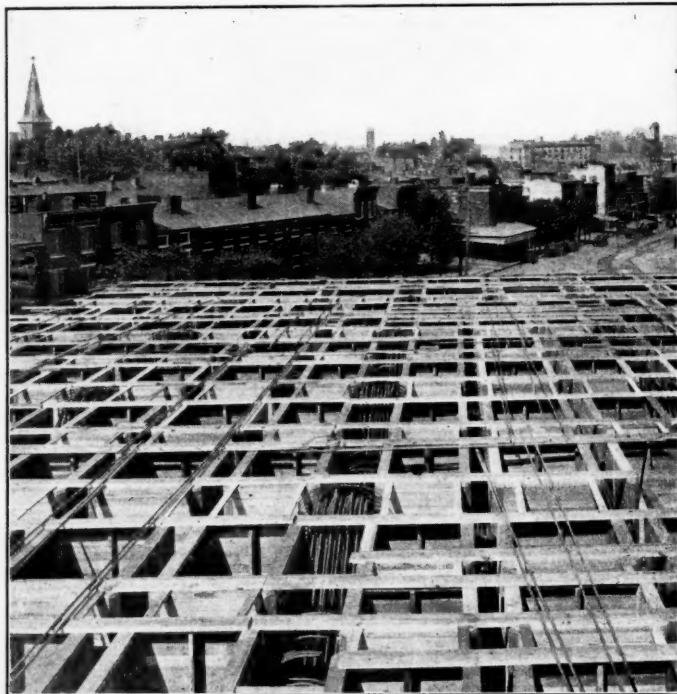
The Baltimore & Ohio unloads the cars, elevates the grain, weighs it and deposits it in bins. These bins are leased to numerous local dealers in Baltimore, who operate the bins just as if they were their own, sending in their teams and loading them with grain sacked out from the bins.



Grain Elevator; Baltimore & Ohio.

the construction. These forms were so constructed that they could be raised as the work progressed, and the four sides of each of the square bin forms, therefore, comprised four interior sides of one bin. A large number of these forms were employed, and as they were always placed at the same level they formed the walls of the bins.

The architectural effect of the outside of the elevator is improved over that of the usual plain elevator design by concrete pilasters, corners, gables and moldings. The enclosed wall of the cupola and train shed were made with Knapp Bros. Manufacturing Co.'s Trusset metal lath, plastered inside and out with a 2-in. coat of Portland cement. The framework of the cupola and train shed is of structural steel. The windows are galvanized-iron framed with ¼-in. wire-



Forms in Position for One Floor.

For receiving, there are two tracks, each having two unloading pits of carload size. The grain is unloaded by power shovels and then the operator pulls a lever opening a gate, which allows the grain to be discharged onto a 30-in. rubber-belt conveyor, below the car pits, and the conveyor belts transfer the grain to the bottom of the elevator legs, which lift it to the top of the cupola. From the head of the legs it is discharged into the garner and held until the weighman is ready. At the proper time he pulls a slide and allows the grain to drop into the scales from the garner. There are two hopper scales, each of 1,000 bushels capacity, with printing attachment on recording beams.

After the grain is weighed it is discharged into any one of the bins directly from the scales through spouts. Underneath the bins are two stories, the upper one being the less sacking floor, where the grain is drawn off from the bins and sacked by eight 3-bushel Richardson automatic bagging scales. These scales are arranged in a row on steel tracks which run under the bins. Using automatic scales, the operator may bag seven bags of three bushels each every minute.

On the sacking floor there are three 24-in. belt bag conveyors for carrying the sacks across the building and discharging to the teams underneath. There are three driveways under the elevator and one alongside under an awning to accommodate teams.

The contractors designed and made the plans under the supervision of M. A. Long, Architect of the Baltimore & Ohio, and the entire work was carried out under the general supervision of A. M. Kinsman, Engineer of Construction of the Baltimore & Ohio.



## RAILWAY RATE MAKING IN PRACTICE.

BY WILLIAM Z. RIPLEY,

Professor of Economics, Harvard University.

## CHAPTER II—Continued.

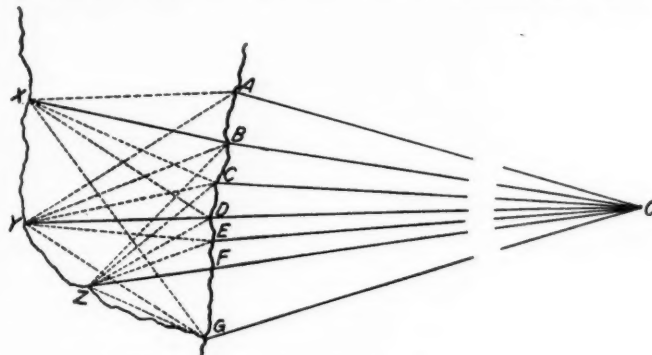
The jobbing or wholesale business of the United States exemplifies the most highly involved and complex details of commercial competition. In this field it appears most clearly that, as is so often alleged, railway traffic managers hold the welfare of entire communities, as it were, in the palms of their hands. In all the cases heretofore cited, great natural forces outweighed the purely personal and human ones. Soil, climate and mineral resources more or less completely determined the final outcome of commercial competition. But the distributive business of a country is more largely artificial. It is more subject to human control, and may be influenced by personal considerations. Shall the economically dependent Southern planter be supplied with manufactures of all sorts, —from harnesses to tin dippers— from Mid-Western cities like Cincinnati and Chicago, or from Eastern centres, such as New York and Baltimore? This is the underlying economic issue raised in the celebrated Cincinnati Freight Bureau Case in 1894; in the course of whose determination the Supreme Court of the United States raised the more immediate and pressing question of the authority of the Interstate Commerce Commission to regulate rates at all. In the dust raised by the controversy over this purely legal question, the basic economic dispute was lost to view.\* Shall the people of the Pacific slope be supplied with hardware and analogous products from their own large cities which buy at wholesale from the East, break bulk at San Francisco or Seattle and ship out to smaller towns in less than carload lots; or shall the distribution take place at the hands of jobbing houses located several thousand miles away at Chicago or St. Louis? This is the economic dispute raised in the St. Louis Business Mens' League case.† The very existence of San Francisco as a commercial center may depend upon it. For the primary and secondary operations of commerce are often complementary. At the large cities, concentration of raw staples moving inward entails naturally back loads outward at low rates for manufactured goods distributed by jobbers. Or taking the smaller places, the farmer will of necessity buy his cotton cloth, sugar and coal in the town to which he drives by wagon to deliver his cotton, corn or wheat.‡

The entire puzzling class of cases dealing with the southern basing point system are primarily concerned with such issues as these. Three distinct classes of cases arise. There is, first, the competition between cities of equal size, be they large or small, such as Memphis, Tenn., and Little Rock, Ark.; Danville, Va., and Lynchburg; or Cleveland, Ohio, and Cincinnati; secondly, the rivalries between large cities and what may be called secondary local centers in the same part of the country, —such as Seattle, Wash., vs. Spokane; Chicago vs. Burlington, or Dubuque, Iowa; or Atlanta, Ga., vs. Macon; and thirdly, the intense rivalries between the great first-class cities, like New York, Philadelphia, and Chicago, and the rest of the field, big and little.§ The mail order houses, the express business and the parcels post intervene at this point. But in all of these issues, series of no less than three separate trans-

portation costs have to be totalized and kept more or less on a parity. The intricacy is increased by reason of the fact that shipments must be made, first at wholesale to the jobbers, and thereafter usually in less-than-carload lots to retailers. If the carload rate be relatively too low, with reference to the rate on small lots, the jobbers near the market will be up-built and the jobbers at a distance cannot compete. If the opposite relation obtains, the jobber in a distant great city will be able to ship out small orders cheaper than the local dealer can obtain them by carload and, breaking bulk, peddle them from his own town. So narrow is the margin of profit on staple goods that a difference of a fraction of a cent per pound may exclude a dealer from the field entirely. This question of carload ratings is, however, treated elsewhere; impinging, as it does upon matters of freight classification.

The rivalries of jobbers and middlemen in different cities are inevitably borne into the offices of traffic managers. Were all railways equally interested in all cities alike, the matter need not go further, engendering railway rivalries. But such is seldom the case. Hardly a road can be named, whose interests are not more or less identified with some particular city. Commercial rivalry thus at once leads to railway competition. Four or five railways, like the Chicago and Northwestern, radiate out to the west from Chicago, and have no interest in St. Louis. Almost as many, like the Missouri Pacific, go out from St. Louis without entering Chicago. Others, like the old Union Pacific, and formerly the Atchison system, only come to the Missouri river, and consequently wish to upbuild their eastern termini, Omaha or Kansas City. Only a few, like the Illinois Central, reach them all. Such a road is usually called upon to act as a mediator in all disputes. "It is a continual struggle between the line from Kansas City to St. Louis, with no interest in Chicago, and the line from Kansas City to Chicago with no interest in St. Louis," as one witness before the Industrial Commission phrases it. Compromise is the only outcome. And in this manner an involved structure of differentials is built up, oftentimes top heavy and always susceptible of collapse on the defection of any party to the agreement. When a truce was patched up between the Trunk Lines and the Gulf roads after the sugar rate war of 1905, it is said to have taken twenty experts three entire days merely to "line up" rates on a parity between the competing jobbing centers.

The simplest compromise in any dispute over rates between competing centers is the concession of absolute equality or,



Traffic Conditions in Missouri River Territory.

as it is called, of flat rates between all points irrespective of distance. This shifts the burden from the carriers and places competition entirely upon the shoulders of the merchants. Oddly enough, also, this result of equal rates regardless of distance between various competing centers, especially when they are secondary distributing or concentrating points rather than original sources of traffic, may sometimes evolve naturally out of commercial conditions imposed by tariffs built up upon the basis of distance. The accompanying theoretical diagram, based upon actual traffic conditions prevalent in Missouri river territory, serves to illustrate the way in which,

\*Both cases are reprinted in *Railway Problems*, pp. 145 and 179.

†Reprinted in *Railway Problems*, pp. 405-441.

‡This is interestingly shown in *Interstate Commerce Reports*, No. 861, decided August 23, 1906.

§Thus, from testimony before the Senate Committee on Interstate Commerce, 1905, pp. 2538 and 2550: "What we claim is that we should not have our territory stopped at the Ohio river by any act of yours. It is not stopped, gentlemen, by any other river in America. It is not stopped by the greatest river, the Mississippi. It is not stopped by the far greater river, the Missouri. It is not stopped by the Arkansas; it is not stopped by the Rio Grande. It is not stopped even by the Columbia; and, even in the grocery business, it is not stopped by the Hudson. There are Chicago houses that are selling goods in New York City, groceries that they manufacture themselves. Mr. Sprague's own house sells goods in New York City, and Chicago is selling groceries in New England. As I say, even the Hudson river doesn't stop them."

under certain circumstances, such equalization of rates may take place. Two groups of cities are here represented as though lying respectively along two river valleys north of their separation at a point G. Let us call them the Mississippi and the Missouri for purposes of identification. The starting point is equality of rates from such a distant point as New York (O) to all places along the Mississippi from A to G. Such equality properly arises in theory from the substantially equal distance from New York. In practice also under the Trunk Line rate system\* such equality prevails, inasmuch as the rates from New York to such a series of Mississippi river crossings is fixed at 125 per cent. of the rate from New York to Chicago. By a similar course of reasoning, namely, the approximately equal distance from New York (O), rates from that place to a second series of points along the Missouri river should be and are in effect made equal. From these two facts it logically follows that the balances of the rates from all points on the Mississippi river out along an extension of their lines from New York toward the west should also be equal. This is obviously in conformity with the mathematical principle that equals subtracted from equals leave equal balances. Thus the rates B X, D Y and F Z are compelled to equality. From this relationship in turn follows still another. All rates from any point on the inner series of towns to any point whatsoever on the outer western series of places along the Missouri river must remain equal regardless of distance. For each line from New York to A, B, C, D, etc., wishes of course, to participate in business not only on the direct extension of its own line but to as many other points as possible.† Without some agreement, however, it would normally enjoy traffic only on the direct extension of its own line. The point Y would most naturally be reached by way of C, D or E, over the shortest routes. Competitors on either side would similarly enjoy an advantage in more direct lines from New York to the places immediately beyond them. Thus for business from New York to Z, the more direct lines through E, F or G would obviously have an advantage over lines which passed around through A, B, C or D. An almost irresistible incentive to cut-throat competition would exist. The only way the lines east of the inner circle can peaceably partition business to the outermost western points is by an agreement to make all rates between the inner and outer circles the same. In this manner the rates from A to Z or from G to X are reduced to an equality with the rates offered by the shortest route between the two rivers, which, in this case, is E Z. The rate for this shortest line then becomes the basic one, upon which all the others depend.

The foregoing economic reasoning underlies the actual tariff system prevailing in what is known as Missouri river territory.‡ Two great streams separating at St. Louis form the eastern and western boundaries of Missouri and Iowa. All along the two edges of these states are located important river cities, each of which has more or less direct communication with every other crossing on the other river, over a complicated system of interlaced lines. There are no physical barriers, the country being plain and open. The starting point and basis of the whole scheme is the shortest direct distance between the two nearest points, namely Hannibal, on the Mississippi, and St. Joseph and Kansas City, on the Missouri. At these points the two rivers are approximately two hundred miles apart. For this distance the base rate of 60 cents per hundred pounds, first class, is fixed by common agreement. Were local business only to be considered and were the railways not competing, the rate between other points on the two rivers at greater distances apart, such as for instance,

Burlington on the Mississippi, and Omaha on the Missouri, might be determined on a relative distance basis, as in Trunk Line territory. But the commercial fact is that a large proportion of the business between all these points consists of long distance traffic from the eastern seaboard which may cross the Mississippi at any one of these gateways between Dubuque and St. Louis on its way to the cities on the Missouri river. All of these through long distance shipments must, of course, enjoy the same competitive rate to the ultimate western destination on the Missouri river. And, inasmuch as the rate from the east to the Mississippi crossings is everywhere the same, namely 125 per cent. of the New York-Chicago rate, it follows that the balance of the rate from these points on to the Missouri river across Iowa and Missouri, irrespective of distance, must likewise be the same. In other words, the rates between all these Mississippi and Missouri river points must be equalized irrespective of the length of the intervening route, whether it be two hundred miles by the shortest direct line from Hannibal to Kansas City across Missouri, three hundred and fifty miles from Burlington to Omaha across Iowa, or even seven hundred miles by the roundabout line of the Illinois Central skirting both states. In brief, every railway which touches both rivers, however circuitous its route, is compelled to quote the same rate from every point on the Mississippi river to every other point on the Missouri. This rate must be the one fixed, as already described, for the shortest direct line, namely 60 cents per hundred pounds first class. Furthermore, in precisely the same way that these rates to Missouri river points from the eastern seaboard are built up and equalized, the rates from Chicago to the same Missouri river points must be kept even. The rate through from any one of the long chain of Mississippi gateways must be the same irrespective of distance. This figure, by common agreement, has for many years been 20 cents per hundred pounds higher than the rate across Illinois to the Mississippi river gateways from Chicago alone. The dominant note of this whole tariff is equalization of rates between all points in competition with one another over all possible routes. Freight thus moves freely in every direction and all markets are held on an absolute parity.\* It is one of the most remarkable features of American commercial organization, this practical elimination of the element of distance from interstate trade over wide areas.

The possible evil lurking in too widespread an acceptance of the principle of the flat rate is clearly apparent in the reasoning of the Eau Claire, Wisconsin, lumber case.† This town complained of the disability under which it labored in shipping lumber to Missouri river points in comparison with other places round about. It appeared in the evidence that as early as 1884, under arbitration, all the rates from competing centers had been adjusted on the basis of differentials; and that, as interpreted by the carriers, the purpose of these differentials was to even up the differences between competing towns; to the end that all manufacturers should be put upon an equality in the consuming territory. But this necessarily involved the practise of penalizing or nullifying in a way the advantages of location. "If Eau Claire could produce lumber cheaper than Winona or La Crosse then the latter points were to have a lower rate in order to enable them to compete." This practise the Interstate Commerce Commission condemned at that time; and it has consistently adhered to the precedent then laid down. Obviously any other general course of action would be analogous to hobbling the fleetest horse in a race to bring him down to the rate of progress of the slowest laggard. The principle of the handicap applied within moderate limits makes for an exciting athletic contest; but if it be overdone, it eliminates all interest from

\*Described in detail with a map showing trunk line percentages in Ripley, *Railway Problems*, pp. 309-333. This map was reproduced in the preceding issue of the *Railroad Age Gazette*.

†This process is described in detail in the chapter on Economic Wastes in Transportation, in Ripley, *Railway Problems*, p. 501.

‡This is exhaustively described in a paper by Robert Mather, President of the Rock Island Co.; published in *Annals American Academy of Political Science*, April 11, 1908; afterwards reprinted in the *Railroad Age Gazette*.

\*Another illustration in the Southern States is given in the Savannah Fertilizer case reprinted in Ripley, *Railway Problems*, p. 293. cf. also the Eau Claire lumber case, in Ripley, *Railway Problems*, p. 216.

†Decided in 1892; reprinted in Ripley, *Railway Problems*, pp. 203-223. Vide, especially, p. 219.



the contest whatever. The race becomes one, not of skill or endurance in running, but of securing a sufficiently liberal handicap. Competition to be of advantage in the way of progress must always have in view the survival of the fittest and the elimination of the unfit.

The vast extent of the United States, the necessity of transporting commodities great distances at low cost and the progressiveness of railway managers, has led to an extraordinary development of the phase of rate making above-mentioned. The principle of the flat rate, based upon the theory that distance is a quite subordinate, if not indeed entirely negligible, element in the construction of freight tariffs under circumstances of competition, was fully accepted twenty-five years ago. J. C. Stubbs, traffic manager of the Harriman lines, speaking of transcontinental business in 1898, clearly expressed it as "the traditional policy of the American lines as between themselves to recognize and to practice equality of rates as the only reasonable and just rule....regardless of the characteristics of their respective lines, whether equal in length or widely different." It is the theory upon which the southern basing-point system is founded; and it is the common practice in making rates into and out of New England—being in fact vital to the continued prosperity of this out-of-the-way territory. President Tuttle, of the Boston & Maine, has most ably supported this principle of equality of rates irrespective of distance. "It is the duty of transportation agents," he says, "to so adjust their freight tariffs that, regardless of distance, producers and consumers in every part of this country shall, to the fullest extent possible, have equal access to the markets of all parts of this country and of the world, a result wholly impossible of attainment if freight rates must be constructed upon the scientific principle of tons and miles." This is the principle of the blanket rate attacked in the famous Milk Producers' Protective Association case in 1897; and it is the practice which has been so fully discussed of late, as generally applied to lumber rates from the various forest regions of the United States into the treeless tract of the Middle West. The principle, while applied thus generally in the construction of tariffs, is of far greater applicability in the making of special or commodity rates. Under such rates the bulk of the tonnage of American railways is at present moved. The essential principle of such special rates, constituting exceptions to the classified tariffs, is that of the flat rate; namely, a rate fixed in accordance with what the traffic will bear, without regard to the element of cost, that is to say, of distance.

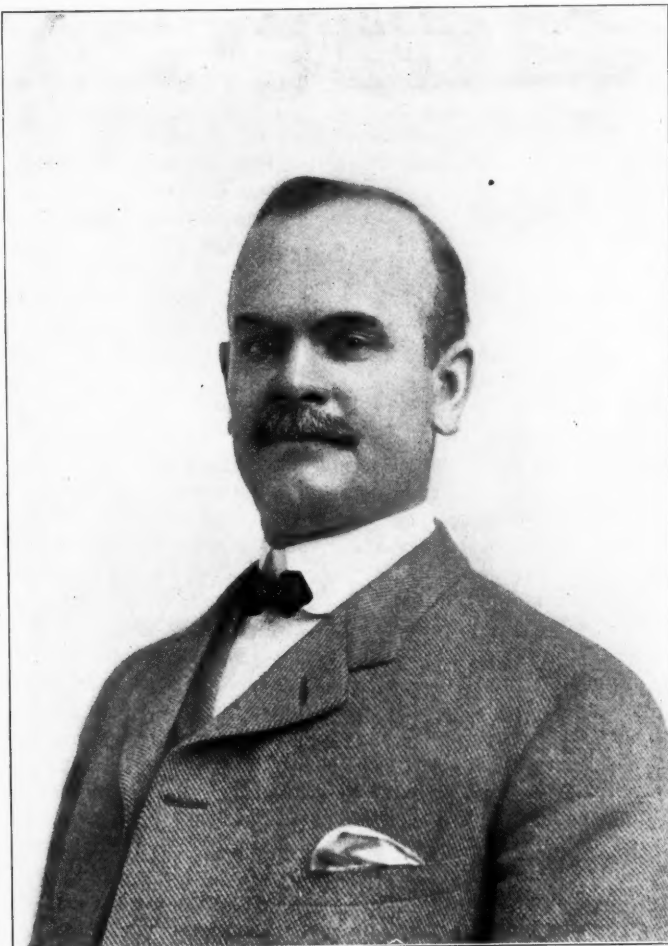
(To be continued.)

In presenting his estimates for the coming year the Prussian Minister of Public Works named as one of the obstacles to

reducing expenses the necessity of keeping all regular employees, however much traffic may fall off. The only reductions in this, the chief part of the force, is by leaving unfilled vacancies caused by death, resignations, etc. In this way, however, the force was reduced in number about 10,000 between December 1, 1907, and December 1, 1908. For the coming year the number of employees will be about 496,000, whose pay will amount to 801 million marks (an average of \$384 per man).

#### WILLIAM A. GARRETT.

William A. Garrett leaves the Seaboard Air Line on November 1 to become Vice-President of the T. H. Symington Co., Baltimore, Md. Mr. Garrett went to the Seaboard Air Line early in 1907 with a well-founded reputation as an organizer.



William A. Garrett.

This was what the road needed, but ready money was needed still more. It could not be raised and the road had to be put in the hands of receivers, Mr. Garrett continuing as chief executive officer for them. As far as can be judged from statements of current earnings, without detailed unit figures, the property is now on the way toward building up the sound credit which will be necessary before it can fully serve its territory.

Mr. Garrett was born in 1862. He began railway work as a messenger boy in a ticket office on the Ohio & Mississippi, now part of the Baltimore & Southwestern. He worked in different departments in the St. Louis Union Depot until he became Assistant Superintendent. In 1893 he went to the Terminal Railroad Association of St. Louis as Superintendent, being also Terminal Superintendent of the Wabash, and after the first year also Superintendent of the St. Louis Merchants' Bridge Terminal. In 1896 he was made Superintendent of the Western division of the Wabash, and in 1897 he was transferred to the Middle division. He went to the Philadelphia & Reading in 1899 as Superintendent of the Philadelphia division. In 1900 he was made Superintendent of the New York division and in 1902 became General Superintendent. The next year he was appointed General Manager of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern. In the fall of 1906 he was elected First Vice-President of the Seaboard Air Line, and on the death of Alfred Walter, a few months later, was made President. He has been active in the American Railway Association and has served on a number of its committees.

His ability to straighten out and build up an operating department earned for him his rapid promotion on the Reading. He maintains strict discipline and brings out the best there is in his subordinates, being quick to notice and encourage those who show initiative and do not hesitate to take responsibility.

## ELECTRIC TRAIN STAFF ON THE SOUTHERN PACIFIC.

The use of the electric train staff by the Southern Pacific in the snow shed district of California is of interest because this is the most extensive installation of this apparatus in America; and this and all installations of controlled manual apparatus on single track are of interest just now because the Northern Pacific,\* in introducing the space interval on 1,000 miles of its road (single-track), has chosen to use no electric apparatus of any kind for controlling the mechanical operations which are performed by the signalman. We have therefore made somewhat full inquiry of the officers of the Southern Pacific as to their experience with the staff.

The fundamental principle of the electric train staff is well-known.†

It was first used on the London & North Western in 1889 by Webb and Thompson, but the functions of the apparatus are about the same as those of Tyler's tablet apparatus, which was in use ten years earlier. The staff, either from superior merit or by better commercial pushing, seems to have come into use more widely than the tablet, and it is to be found not only throughout Great Britain, but in Australia and other eastern countries. The principle is employed not only by the firms above mentioned, but by Sykes and other English firms, who have supplied apparatus for railways in Russia, Japan and elsewhere. The reason why these other countries have adopted the staff so much more extensively than have American railways is explained by some on the ground that these countries are slower than we are; and by others on the ground that we are the slower. Both explanations are in some degree right. English railways and those which follow the English pattern do not attempt to do a heavy traffic on single-track. If trains must be frequent, a second main track is built. The staff, therefore, is not called upon to perform lightning changes when trains meet. An American railway officer wants his trains to meet without wasting more than 15 seconds, and of course in such circumstances the staff cannot fill the bill without expensive additions which no railway financial board has yet seen fit to authorize.‡ On the other hand, those roads which do wish to use the staff with the least delay to trains put up apparatus for delivering the staff to engines at high speed and for receiving from engines at any speed. That is a simple appliance which American railroads thus far seem loath to take the pains to introduce. We are so enterprising and progressive that we change our locomotives or our clearance standards or some other feature so often that we cannot equip our locomotives so readily as can the conservatives of Scotland and New South Wales.

In this country, where every railway officer is acquainted with automatic block signals, the most obvious argument in favor of the staff is that in places where block sections are not required to be short it can be more cheaply and quickly

installed than can any other system equally simple and safe. Assuming the cost of \$500 a station, a line of 20 stations costs for apparatus \$10,000; and if these 20 stations are six miles apart (114 miles of road) the cost is no greater than for the same number of stations on 19 miles, except for the 95 miles of additional telegraph wire.

But the officers of the Southern Pacific seem to have ample funds for automatic block signals, and they are erecting new automatics all the time. Their testimony in favor of safety, convenience and general satisfactoriness of the automatic system indicates that they would be satisfied with such signals on any single-track line in any situation. They have hundreds of miles of line where there is little need of having agents nearer together than 15 to 30 miles, while yet it is often desirable to run over these lines long, heavy and fast trains within 10 minutes of each other—a situation which gives the automatic system a great advantage. We must, therefore, give full weight to the declaration of the officers that, at the time the staff apparatus was put in, the necessity of having agents on duty at regular intervals on this line for the purpose of supervising the work of the fire patrol in the snow sheds was an important if not the ruling element in their decision to adopt the staff. It will not be surprising, therefore, if after the other important lines of the company are equipped with automatic signals, we shall hear that automatics have been substituted for the staff in the snow sheds.

As before intimated, the present account of the staff aims principally to enable the reader to intelligently compare it with the tripartite manual blocking which has been introduced on the Northern Pacific.

The Southern Pacific line worked by the staff extends from Loomis, Cal., eastward to Truckee, Cal., 94 miles. The system was put in use in August, 1905. That part of the line west of Loomis, which for the last three years has been worked by the staff, is now double-track, and is equipped with automatic block signals. Of the 94 miles, a length of 29 miles (Tunnel 13 to Emigrant Gap) is covered almost continuously by snow sheds. The stations are from two to three miles apart, as shown in the table on following page.

The grade eastward for most of the distance is 2.2 per cent., ascending, or about 116 ft. to the mile. The eastbound trains are heavy and cannot run faster than about 15 to 25 miles an hour, while westbound the speeds are also rigidly held low on account of the steepness of the grade.

In the snow sheds every engineman receives notice by fixed signals of his approach to a block station, and these signals tell him whether or not he is to enter the side track. In entering a side track, the train is stopped before reaching the switch and the front brakeman goes forward to set it. After leaving a side track the train must stop and wait for the rear brakeman to set the switch straight. The distance from the switch, measured by freight-car lengths, is marked at intervals both ways from the switches—east from the east switch and

\*See *Railroad Age Gazette*, February 19 and 26.

†The train staff in its original form was a stick of wood (or metal) about 20 in. long, to be given to the engineman of a train to signify that he had the right of track between two stations, the names of the stations being painted or engraved on the staff. This right is absolute, regardless of time or of any rules or conditions, making time-tables unnecessary, so far as safety is concerned. A train running from A to B would have a certain staff; and then from B to C another staff of different shape or color, and so on. If two (or more) trains were to be run from A to B before any train returned from B to A, the engineman of the leading train, having seen the staff, received his authority in the shape of a ticket; and the second or last train would take the staff, together with any remaining tickets belonging to that section. To obviate the inconvenience which was caused under this arrangement, whenever the staff and its tickets happened to be at the wrong end of the section, the electric train staff apparatus was devised. In this system each station has a pillar containing a magazine of staffs, say from 10 to 35, and, by electric locks, properly connected from station to station, it is made possible to secure the right of the road at any time from either end of a section, yet never from but one end at the same time. That is to say, the withdrawal of a staff from a pillar at either station at once locks the pillars at both stations so that no other staff can be taken out until the one already out is replaced either at one station or the other. No staff can be withdrawn at any time except by the joint action of the operators at the two stations. To move a train, say, from A to B, the operator at A, closing an electric circuit, rings a bell at B; the operator at B closes a circuit to acknowledge the receipt of this bell signal; and, holding the circuit closed, de-

flects a needle at A, thus informing A that his instrument is energized by a current from B; and A then takes the staff out of the pillar. In this process of removal the operator at A displays a disk in the machine which gives a visible indication of what has been done, and he also reverses the polarity of the operating current, which throws the instruments at A and B out of synchrony. Whenever the staff is returned to the pillar, whether at A or B, the machines are again synchronized and another staff can be taken out. To take out a staff occupies a period of about five seconds, and to put one in, two seconds. ‡The ideal arrangement for controlled manual signaling on single-track would be to have a double-track for a half-mile through the station; switches at both ends, provided with home and starting signals suitably interlocked, and worked electrically from the office in the center; distant signals at the approaches; derails at each outlet to prevent a train from starting until the signalman, having assurance that the block is clear, has cleared the signal; and electrical means for checking the signalman from the other station. Being thus checked he can keep the staff in his office, instead of delivering it to the train. Having taken out a staff for a train, he can (using the staff as an instrument) clear the signal and close the derail. The clearing of the signal should lock the signal lever so that the signal cannot be cleared again till the train has reached the other end of the block. The controlled manual systems without continuous track circuit cannot protect against the danger of assuming that the whole of a train has arrived when a part has been accidentally detached, of course, unless the staff is carried through and unless, in whole or in part, it is carried on the rear car. And it cannot protect against broken rails unless the signals are controlled by a track circuit extending throughout the block.



west from the west switch—on the inner walls of the sheds, plainly visible to the enginemen, to enable them to stop at the right place for the rear brakeman to regain his place on the train.

On that part of the line which is in the sheds the staff stations are in a little building outside but opening into the shed. Throughout their length the sheds are open enough to let in some daylight and for passengers in the cars to see out; yet dark enough to make "light" signals available throughout; and no semaphores are used.\*

A staff to be delivered to an engine is put into a rubber tube which is hung to an iron ring about 15 inches in diameter, and this the signalman hangs on a crane at the side of the shed, from which the engineman or fireman, according to which side of the road the staff is found, takes it by running his arm through the ring. Just before doing this he drops to the ground the staff which he has brought from the station in the rear.

Immediately on receiving the staff the engineman gives a whistle signal, one long and one short blast. The head brakeman is required to be on watch and to stop the train immediately if this signal is not given at once. This duty having

so that while waiting the engine will be near the office. This is not the case at all stations on the Southern Pacific. This dealing with waiting trains is the only serious cause of delay. If a staff, when thrown or dropped off the engine, should accidentally drop down into a gorge a thousand feet deep, as is possible in some places in the Sierra Nevada mountains, traffic would be out of gear on that block until the signal maintainer could be found, to restore equilibrium of the machines by taking out another staff. A staff lost where possibly a mischievous person may find it, produces, of course, an undesirable situation.

As with any system of electric signal apparatus, the wires must be so arranged that circuits formed by the crossing of wires or currents from any foreign or unauthorized source cannot so disturb the apparatus as to make possible the giving of a clear signal wrongfully. With the staff, for example, a cross must not close an electro magnet in such a way as to let B take out the staff without first asking C. On the Southern Pacific the wires from station to station have been put in a cable to guard against this.

With the staff as used on the Southern Pacific and the A. B. C. rules as used on the Northern Pacific, there are a number of interesting comparisons.

On both roads absolute blocking is the invariable rule. The signalmen do not have to trouble themselves with the complication of having two trains in a block at once.

On the Southern Pacific the staff is delivered to and taken from the engine alone and the signalman does not have to communicate with the conductor. On the Northern Pacific the block card has to be delivered in duplicate—to the engine and to the rear of the train. The conductor, however, does not have to surrender the card at the outgoing end of the block. The arrival of the rear part of the train there is certified in the usual way by the signalman as the markers pass his window; or, if the train is on the siding short of the office, by word of mouth or hand signal from the conductor.

On both roads at present trains must run slowly enough to permit the staff or card to be taken on by hand. On parts of the Northern Pacific, where speeds are not limited by the grades, there is in use a new and simple apparatus for taking on the cards at any speed. On other parts of the road cards are fixed in rattan hoops. These are frequently lost however. They can be delivered at twenty-five miles an hour readily enough, but for entire convenience every operation should be prepared for in such a way as to entirely eliminate the question of speed of trains.

On both roads all trains, so far as rights are concerned, are on an absolute equality. On the Northern Pacific an engineman or conductor receiving a card can often guess by the engine number shown in an "exception" on the card what train he is to meet at the next station; but on the Southern Pacific he has absolutely no information. Until he reaches the approach signal he does not know whether or not he will be required to meet any train, or even whether he must stop. This arrangement, it hardly need be said, is the antidote for one of the worst uncertainties of the train order system.

The two systems are alike in training enginemen to the habit of invariably getting something into their hands from the signalman at each station before leaving that station. The difference between the simplicity of this plan and the complexity of time tables and train orders is so great that it is difficult to make a comparison. The American railway trainman, who has always run by train orders, finds it hard to appreciate the simplicity of the staff; while the Englishman, who has always used the staff, is appalled when he hears of the mental task that is imposed on American freight conductors when they receive a half dozen poorly written tissue sheets at 2 o'clock in the morning.

On the Southern Pacific the staff always gives full right to

SOUTHERN PACIFIC CO. (Pacific System).  
List of Staff Stations—Truckee to Loomis.

Stations.	Distance, miles,— Between		Stations.	Distance, miles,— Between	
	sta- tions.	From Truckee		sta- tions.	From Truckee
DN Truckee .....	0.0	0.0	T Magma .....	3.35	58.24
T Champion ....	3.56	3.56	DN Caporn .....	2.61	60.85
DN *Tunnel 13....	4.08	7.64	T Wirt .....	2.26	63.11
T Eder .....	2.19	9.83	DN Colfax .....	2.25	65.36
DN Lake View ....	1.80	11.63	T Lander .....	3.08	68.44
DN Summit .....	2.70	14.33	DN N. Eng. Mills..	1.97	70.41
T Soda Springs ..	2.96	17.29	T Applegate ....	3.31	73.72
DN Spruce .....	2.81	20.10	DN Clipper Gap...	2.97	76.69
T Troy .....	2.02	22.12	T Bowman .....	3.41	80.10
T Tamarack ....	2.00	24.12	DN Auburn .....	3.30	83.40
DN Cisco .....	3.51	27.63	T Zeta .....	2.98	86.38
T Crystal Lake ..	2.16	29.79	DN Newcastle ....	1.91	88.29
DN Yuba Pass ...	2.08	31.87	DN Penryn .....	3.18	91.47
T Smart .....	2.76	34.63	DN Loomis .....	2.88	94.35
DN *Emigrant Gap	1.50	36.13			
T Fulda .....	2.05	38.18			
DN Blue Canon ..	3.15	41.33			
T Oral .....	2.64	43.97			
DN Midas .....	2.08	46.05			
T Gorge .....	2.29	48.34			
DN Towle .....	1.80	50.14			
DN Dutch Flat ...	2.63	52.77			
DN Gold Run ....	2.12	54.89			

\*All stations from Tunnel 13, to and including Emigrant Gap are in snow sheds.  
DN—Day and night telegraph office.  
T—Day and night telephone office.

been assigned to the front brakeman, the conductor and the rear brakeman have no specific duty in connection with the staff.

These operations being duly carried out there is, of course, no delay to make a stop if the block is clear. If a long train is waiting at a station on the siding, having arrived before the block in advance is clear, there may be delay in delivering the staff to the engineman, who perhaps may be several hundred feet from the office. With any system of this kind each station should have lap sidings and trains should always enter

\*The signal used was described in the *Railroad Gazette* of September 18, 1903. It is a lamp fixed to the side of the shed, having a single bull's-eye; and this is made to give either of two color indications by dividing it horizontally into halves of different colors, and by providing shutters by which the halves may be alternately blinded. The shutters are moved by a solenoid. Sufficient power for this is furnished by one cell of storage battery or five cells of gravity battery. The clear indication can be given in a little over one second of time. At the approach to a station having a side track, there are two signals, fixed one above the other, on the same post. The indications are as follows:  
Upper signal red and lower yellow.—Train must stop and take passing track.

Upper green and lower yellow.—Train will proceed cautiously along main line prepared to stop at staff crane.

Both upper and lower green.—Train may proceed along main line expecting to secure staff and right of track through the next block.

The upper signal is made semi-automatic by means of a track circuit between the fouling points of the side track switches so that it cannot be cleared unless that section of track is unoccupied. Each signal is also provided with a distant signal of the same type, situated approximately 1,000 ft. for up-grade trains and 1,500 ft. for down-grade, in the rear of the home signal. This distant signal is also interlocked with the outside switch so that it shows yellow whenever the switch is out of position, or whenever the home signal is at red. Each station is also provided with an indicator, fixed over the operator's table, showing red when the track is occupied, or when any switch is set for the siding.

the next station, subject to no modification until the train reaches the approach signal at the next station. This signal has to be watched for, of course, like any fixed signal; and it modifies the authority of the staff to the extent of selecting the track which is to be entered and (if the main track) whether or not the train will be required to stop. On the Northern Pacific the right given may be qualified in a similar way, but the qualifying information is given not by an approach signal fixed in position, but by a written statement which is found on the card when it is received at the starting point (entrance of the block). It may also be qualified further by a direction written on the card to meet an opposing train or to be passed by another train moving in the same direction, or to pass another train headed in the same direction, at an intermediate siding which is not a block station.

The operations of signal men are quite different as between the two systems. The staff could be worked by a man with minimum educational qualifications. On the Northern Pacific the signalman must know how to write legibly and carefully. With the telegraph he should be a careful operator. With the telephone he should be careful in enunciation of words and in the performance of all his duties so as not to burden the despatcher with the task of guarding against his errors. The mental work of reading and writing orders cannot be compared with the operation of a machine of brass and iron; but, being unable to make this comparison, we may compare re-

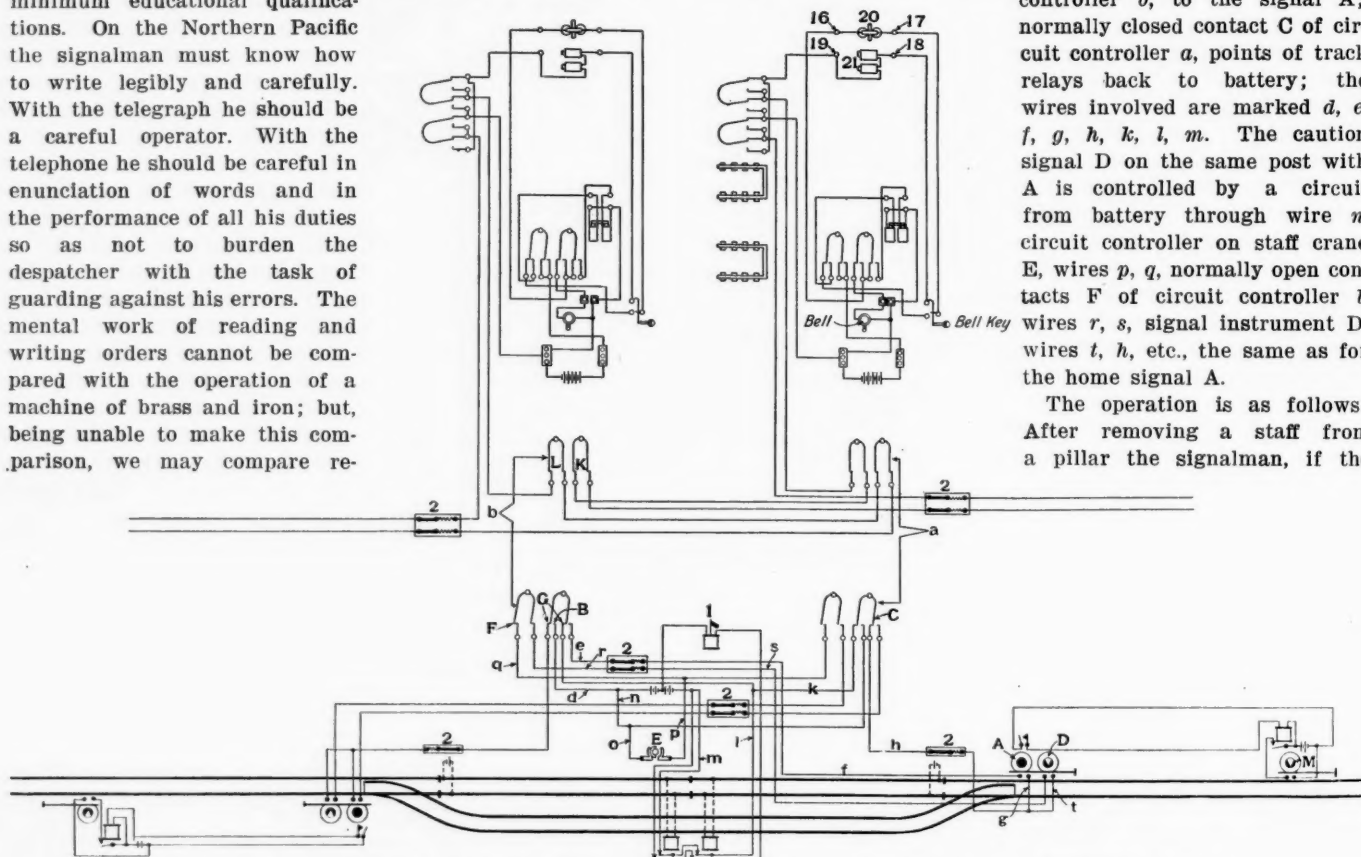
the despatcher for instructions, or unless the despatcher wishes to modify the normal operation of the station by issuing special instructions for the meeting of trains.

The circuits used to control the signals at the Southern Pacific staff stations are shown in the drawing. The circuits for the staff instruments proper are shown in the upper part of the drawing and are in no way peculiar to the Southern Pacific, except for the circuit controllers *a* and *b*, which are repeated in the lower part of the diagram.

In order to expedite traffic the signals and circuits shown in the lower part of the drawing are used at all staff stations. These signals are controlled by the circuit controllers (*a* and *b*) and also by track circuits. The outer or distant signals merely repeat the indication of their respective home signals. Each home signal, *A* for example, is controlled by a circuit from the battery through a normally open contact, *B* of circuit

controller *b*, to the signal *A*; normally closed contact *C* of circuit controller *a*, points of track relays back to battery; the wires involved are marked *d*, *e*, *f*, *g*, *h*, *k*, *l*, *m*. The caution signal *D* on the same post with *A* is controlled by a circuit from battery through wire *n*, circuit controller on staff crane *E*, wires *p*, *q*, normally open contacts *F* of circuit controller *b*, wires *r*, *s*, signal instrument *D*, wires *t*, *h*, etc., the same as for the home signal *A*.

The operation is as follows: After removing a staff from a pillar the signalman, if the



Circuits for Electric Train Staff and Approach Signals at Train Staff Station—Southern Pacific.

References: 1, Indicator; 2, Lightning arresters; 16, 17, 18, 19, Terminals; 20, Polarized indicator; 21, Neutral indicator.

sults; and thus far the men have made a good record.

The despatcher has substantially the same work with either system, except that, naturally, or from force of habit, he will watch for any error on the part of a signalman to whom he is sending orders, whereas with the staff he has no orders to send, except those which are required to put the less important train on the siding where meets are to be made (which train is not always that one which is running in the inferior direction).

On the Southern Pacific the orders from the train despatcher to the signalman for the movement of a train are given verbally, no specified form being used. The despatcher usually says, for example, "Head No. 3 in," or "Put No. 4 on Siding." This is not recorded on the train sheet, nor is it repeated back to the despatcher. At all regular scheduled meeting points, or meets under normal conditions the signalmen, without directions from the despatcher, set the signals for the proper train to take the siding. That is to say, the signalman operates under the rules unless he is in doubt, in which case he asks

train is to go through without stopping, inserts the staff in one of the staff-operated circuit controllers, say *b*. This unlocks the circuit controller and the operator turns the handle, thereby closing contacts *B* and *F* and opening contacts *G*, *K*, *L*. This clears signals *A* and *M* (provided there is no train on the station track circuit) and opens the line circuits of both staff instruments. The signalman now withdraws the staff from the circuit controller and suspends it from the staff crane, thereby closing circuit controller *E* and clearing signal *D*. When the staff has been caught by the passing train circuit controller *E* opens automatically, thereby setting signal *D* at caution. Before the signalman can again manipulate either of his instruments he must restore circuit controller *b* to its normal condition as the main line circuits for both staff instruments were opened by the reversal of this circuit controller, thereby setting signal *A* at stop and signal *M* at caution.

Should the signalman desire to stop the train before delivering the staff he would omit to put it in the crane, but would



reverse the circuit controller *b*. In this case signal A would show green and signal D yellow, which would inform the engineman that he was to proceed on the main line prepared to stop at the staff station. If signal A were to show red and signal D yellow it would constitute an order to enter the siding.

Seven maintainers are employed in the district between Roseville and Truckee in addition to a district foreman. These men, in addition to caring for the staff system, maintain the fire alarm system and the district telegraph system in use between Oral and Truckee, as well as telephones and crossing bells.

During the busy times of 1907 this line was worked to its full capacity and the train despatchers were often kept busy continuously for many hours arranging meeting points and giving the instructions to the station operators as to what trains should be held on the side tracks. In the last six months of 1907 the eastbound freight movement averaged 234½ cars a day, westbound 215 cars.

At the present time the line is not so crowded. A sample signalman's register, that made at Emigrant Gap, for the 24 hours ending at midnight, December 3, 1908, shows 11 trains eastbound and 17 westbound, seven of the westbound being empty engines. The leaving times of these trains at Emigrant Gap were as follows:

Eastbound.*	Westbound.*	Eastbound.*	Westbound.*
1:23 a.m.	E., 2:45 a.m.	P., 6:20 p.m.	L., 2:21 p.m.
3:52 "	E., 4:08 "	P., 8:01 "	E., 3:40 "
P., 4:07 "	E., 5:35 "	....	P., 4:57 "
P., 6:08 "	E., 6:38 "	....	E., 6:01 "
P., 7:50 "	E., 7:41 "	....	L., 8:03 "
9:20 "	E., 8:40 "	....	E., 8:27 "
12:09 p.m.	E., 12:10 p.m.	....	E., 8:53 "
L., 2:22 "	E., 12:47 "	....	P., 12:02 a.m.
P., 6:00 "	P., 12:58 "	....	

\*P., passenger; L., local freight; E., empty engine.

#### NOTES ON RAILWAY ELECTRIFICATION.\*

BY JOHN A. F. ASPINALL.

General Manager of the Lancashire & Yorkshire Railway.

#### III.

##### TRAIN RESISTANCE.

On account of the many difficulties of determining accurately the resistance of electrical trains, tests were taken by running a train up to full speed, shutting off the current, and allowing it to coast until it came to rest. Measurements of speed were taken at 5-second intervals, Fig. 5.

The mean curves of several tests for 2, 3, 4 and 7-car trains are plotted out on Fig. 6, and the chief figures are shown in the following table. In each case allowance has been made for

of the figures obtained. They are probably due to sudden variations in the wind.

Of course curves 1-4, Fig. 5, give the train resistance, including the part used for locomotive purposes, but to compare with steam stock this part should be eliminated, and this has been done by taking the difference between two motor-cars

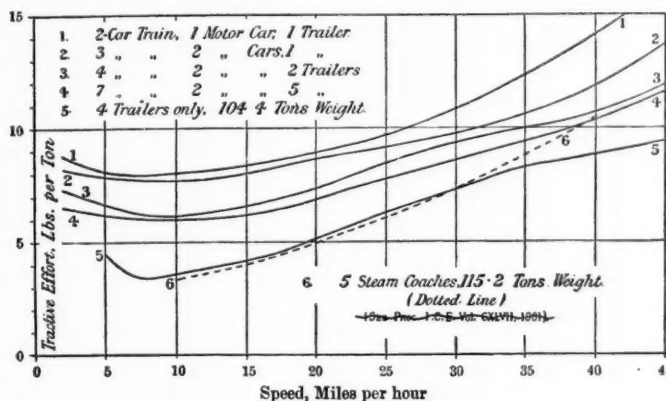


Fig. 5—Time Speed Curves for 2, 3, 4, 5, 6 and 7-Car Trains.

and one trailer, and two motor-cars and five trailers. Assuming the train resistance of the two motor-cars and one trailer to be the same in both cases, the train resistance in lb. per ton of the extra trailers is shown in curve 5, and the chief figures in the following table. Curve 5 gives figures which are

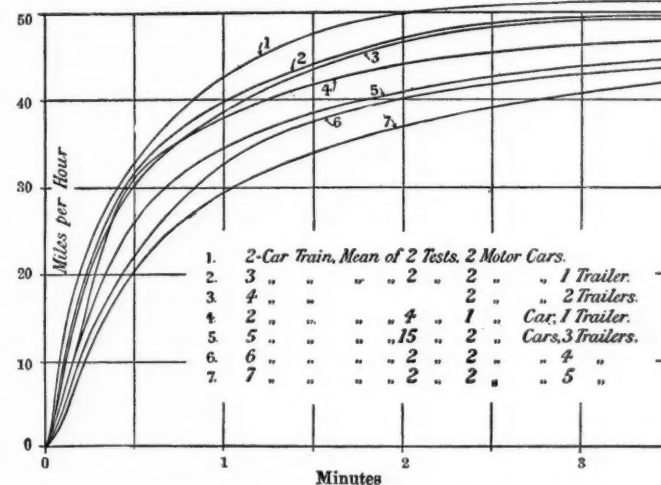


Fig. 6—Tractive Effort for 2, 3, 4 and 7-Car Trains.

PARTICULARS OF ACCELERATIONS FOR 2 TO 7-CAR TRAINS. (See Fig. 5.)												
No. of cars in train.	Composition of train.	Max. speed in m.p.h.	Time in seconds to attain miles per hour					Speed in miles per hour after minutes				
			10	20	30	40	50	1/4	1	2	2 1/2	3
2	2	51.5	5	11.5	25.5	49.5	120	32.5	42.75	47.75	49.8	51.2
3	2	49.625	7	14	27.75	60	..	31.5	40.0	44.2	46.9	48.6
4	2	49.25	7.5	15	29	65	..	30.3	39.0	43.75	46.5	48.2
5	1	46.75	9.5	17.5	28	72	..	31.0	38.5	41.8	44.0	45.3
6	3	44.75	9.5	20.75	40	106	..	25.6	34.65	38.5	41.0	42.7
7	4	43.875	11.5	26	50	116	..	22.0	32.8	37.6	40.3	43.1
	5	42.0	13.0	30	64	162	..	20.0	29.4	34.0	37.0	39.3

#### PARTICULARS OF TRAIN RESISTANCE. (See Figs. 5 and 6.)

PARTICULARS OF TRAIN RESISTANCE. (See Figs. 5 and 6.)															
Curve No.	No. of cars.	Composition of trains		Weight of train, tons.	Length of train, ft. ins.	Train resistance at various miles per hour in pounds per ton.									
		Motor cars.	Trailer cars.			5.	10.	15.	20.	25.	30.	35.	40.	45.	
1	2	1	1	71.537	121 8	8.5	8.0	8.5	9.0	9.5	10.75	12.5	14.0	...	
2	3	2	1	117.175	183 4	7.75	7.75	8.0	8.6	9.0	9.75	10.5	12.0	13.75	
3	4	2	2	143.275	248 6	6.5	6.0	6.5	7.25	8.5	9.25	10.0	11.0	12.0	
4	7	2	5	221.575	430 0	6.25	5.75	6.25	7.0	7.75	8.5	9.5	10.5	11.5	
5	4	Trailers only.		104.4	246 8	4.52	3.55	4.18	5.2	6.34	7.09	8.36	8.81	9.45	
6	5	*Ord. bogie coaches.		115.2	285 0	...	3.3	...	5.0	...	7.4	...	10.5	...	

\*See Proceedings, Institution of Civil Engineers, Vol cxlvii, 1901.

the effect of gradients, and the tests were made in both directions to eliminate as far as possible the effects of head winds.

It may be noticed that curves 2 and 3 do not follow paths parallel to curves 1 and 4, but they are true representations

\*From the Presidential address before the Institute of Mechanical Engineers, April 23, 1909.

comparable with steam practice, values of which are shown in curve 6, which is taken from the Proceedings of the Inst. Civil Engineers, vol. cxlvii, part 1, "Aspinall on Train Resistance," for a train of 5 coaches of similar weight.

Tests for acceleration were carried out by running the trains up to speed under service conditions, the speed being taken as

before. In addition, readings were taken at 5-second intervals of current, line volts, and volts across the motor terminals.

From the speed curves thus obtained, the acceleration in feet per second per second was obtained.

#### Motor Miles and Motor-Car Miles.

Half-year ending:	Motor miles		Total motor miles.	Motor-car miles.
	150-h.-p.	125-h.-p.		
June, 1906.....	4,649,334	153,642	4,802,976	1,261,154
December, 1906....	4,957,064	413,409	5,370,473	1,467,970
June, 1907.....	4,712,348	575,440	5,287,788	1,483,095
December, 1907....	4,884,060	710,066	5,594,126	1,585,227
June, 1908.....	4,861,612	618,862	5,480,474	1,539,671
December, 1908....	4,788,910	699,206	5,488,206	1,554,518

The following table gives the cost for repairs, wages, repairs materials, stores, inspection, general maintenance of all electrical equipment and motor bogies, electrical equipment of trailers, but exclusive of trailers and the coach bodies of the motor cars, i. e., it is a true representation of the cost of maintenance of the motive power portion of electric rolling stock:

Half-year ending:	No. of motor-cars, end of half-year.	No. of motors.	Wages—Per motor-mile.		Materials—Per motor-mile.		Wages & materials—Per motor-mile.		Total cost per motor, 125 or 150 h.-p.	Oil—All classes, per 1,000 motor-miles, gals.	Average No. of miles per motor car per annum.
			Total.	£ d.	Total.	£ d.	Total.	£ d.			
June, 1906.....	51	178	3,458	0.173	3,016	0.151	6,474	127	0.324	36.4	49,456
December, 1906....	52	180	4,885	0.218	4,656	0.208	9,541	184	0.426	53.0	56,460
June, 1907.....	52	180	4,902	0.223	5,097	0.231	9,999	192	0.454	55.5	57,042
December, 1907....	60	212	5,395	0.231	4,239	0.182	9,634	161	0.413	45.4	52,840
June, 1908.....	64	228	5,168	0.226	4,184	0.183	9,352	146	0.409	41.0	48,114
December, 1908....	64	228	4,362	0.191	3,119	0.136	7,481	117	0.327	32.8	48,598

#### Mileage Between Overhaul.

Half-year ending:	Stand-ard bogies, miles.	Whls. bet. turning up of tires, miles.	150-h.-p. armature, miles.	All classes			Life of	Brake blocks, miles.
				bear-ings, miles.	Brushes, miles.	Shoes, miles.		
June, 1906.....	17,750	.....	.....	.....	11,000	.....	.....	1,683
Dec., 1906.....	28,800	39,000	124,000	44,000	11,680	112,500	.....	1,784
June, 1907.....	32,700	38,000	115,000	41,700	12,640	127,300	.....	1,915
Dec., 1907.....	32,600	49,400	87,300	49,000	15,550	116,000	.....	2,150
June, 1908.....	32,800	42,300	128,000	63,000	13,300	78,500	.....	2,320
Dec., 1908.....	28,500	30,300	171,030	87,100	10,900	102,000	.....	2,680

The original diameter of commutators was 17½ in., the present average diameter being 16½ in., representing a loss in diameter of ⅞ in., or about 0.175 in. per annum, 0.003 in. per 1,000 miles; about one-half of this being due to wear, and one-half to turning up. The commutators can be worn down at least to 15½ in. diameter, so that their total life will probably be about twelve years.

#### WEIGHT OF ELECTRICAL EQUIPMENT ON ELECTRIC TRAINS.

Composition of train.	System of control.	Weight of motors, lbs.	Weight of electrical equipment, † lbs.	Weight of electrical equipment, ‡ lbs.	Total weight including passengers, lbs.	Ratio weight electrical equipment to weight of motors.	Weight of electrical equipment to total weight, per cent.	Seating capacity.
Motor car .....	Direct.....	26,200	32,900	39,816	103,040	1 to 1.26	31.95	66 and 69
Motor car .....	Multiple unit.....	26,200	.....	113,120	.....	.....	.....	68 and 80
Motor car .....	Multiple unit.*	8,680	15,008	16,212	49,280	1 to 1.73	32.85	70
Trail car .....	.....	.....	644	58,240	.....	.....	0.935	66, 80 and 90
2 motor cars, 1 trail car.....	Direct.....	52,400	64,960	80,276	264,320	1 to 1.27	25.20	204 and 218
2 motor cars, 2 trailers.....	Direct.....	52,400	66,988	80,864	322,560	1 " 1.28	20.80	270, 284 and 298
2 motor cars, 3 trailers.....	Direct.....	52,401	67,732	81,508	380,800	1 " 1.29	17.80	336, 350, 364 & 378

\*For Liverpool overhead service.

† Including motors. The weight of auxiliary apparatus, such as vacuum pump motor, etc., is not included, since this does not form part of the electrical equipment for tractive purposes.

‡ Including motors, auxiliaries, and part weight of motor bogies. Part weight of bogies is included, so as to make the weight of the electrical equipment compare with steam practice. The trailer-car bogies are taken as being sufficiently strong for running purposes, and the extra weight of the motor-car bogies as being required for locomotive purposes.

#### Tests to Show Relative Properties of Various Third-Rail Materials.

Rail.	Lancashire & Yorkshire Ry.		North Eastern Ry.	Plecadilly & Brompton.	Metro-politan.
	Tensile tests:	Tons per sq. in.			
Per cent. elongat'n on 3 in.	24.3	23.7	22.1	22.1	25.1
Per cent. contraction.	40.0	35.0	37.0	34.0	34.0
Impact test by Izod machine, ft.-lbs.	76.0	69.5	69.5	69.5	69.5
Abrasion tests, relative losses: (1) .....	12.2	9.9	2.0	13.1	.....
(2) .....	1.0	0.703	0.414	0.958	.....
(3) .....	1.0	0.66	0.96	0.706	.....
Average .....	1.0	0.654	0.755	0.721	.....
Corrosion—Relative loss:	.....	.....	.....	.....	.....
In distilled H <sub>2</sub> O.....	1	1.71	1.57	1.71	.....
In salt water .....	1	1.18	1.09	1	.....
Resistance compared with copper .....	7.23	7.32	7.29	8.39	.....

#### Resistance of 3d and 4th Rails.

Weight of rails .....	70 lbs. per yd.
Area of cross-section.....	6.84 sq. in.
Electrical resistance (average, 69 tests).....	7.23 times that of pure copper.
Chemical analysis .....	0.045 C. 0.04 S. 0.046 P. 0.23 Mn.
Resistance of 1 mile of unbonded main line track (single) with ordinary fishplate joints .....	= 2.8 ohms.
Of solid rail, per mile .....	= 0.043 ohm.
1,000 yds. of 3d rail, inc. joints and bonds (avg) .....	= 0.02416 ohm.
Ratio of resistance of 1-ft. of solid rail to 1-ft. of rail containing a joint bonded with new bonds.....	= 1 to 1.57
With all-web bond strands cut .....	= 1 to 2.4
With all strands cut except 6.....	= 1 to 7.26
With all strands cut, fishplates only .....	= 1 to 1182
The three last values demonstrate the value of good bonding.	.....

#### WEAR AND CORROSION OF 3D AND 4TH RAILS. (3d being Live Rail; 4th being Return Rail.)

Place.	Rail.	Position.	Date laid.	Present weight, per yard.	Per-centage of loss of weight.	Present sectional area, sq. in.	Per-centage of loss of area.	Loss of area—By wear, by sq. in.		Loss, area by Cor-rosion, sq. in.	Per-centage of loss of area by corrosion.	Percentage ratio—of loss by—Wear. Cor-rosion.	
								By wear.	By corrosion.				
Liverpool .....	3d	Up main line.	Jan., '04	59.30	15.28	5.93	15.28	0.39	5.57	0.68	9.71	36.45	63.55
	3d	Turntable siding	" '04	61.90	11.57	6.30	10.00	.....	.....	0.70	10.00	.....	.....
	4th	Up main line.	" '04	58.50	16.43	5.92	15.43	.....	.....	1.08	15.43	.....	.....
Liverpool* .....	3d	Down main line.	" '04	56.8	18.86	5.76	17.71	0.39	5.57	0.85	12.14	31.45	68.55
	3d	Down main line.	" '04	65.00	7.14	6.50	7.14	0.24	3.43	0.26	3.71	48	52
	3d	Crossover road.	" '04	65.20	6.85	6.48	7.43	.....	.....	0.52	7.43	.....	.....
Waterloo .....	4th	Down main line.	" '04	66.90	4.43	6.62	5.43	.....	.....	0.38	5.43	.....	.....
	3d	Down main line.	" '04	65.70	6.14	6.46	7.71	0.25	3.57	0.29	4.14	46.3	53.7
	3d	Crossover road.	" '04	67.60	3.43	6.75	3.57	.....	.....	0.25	3.57	.....	.....
Crosby .....	4th	Down main line.	" '04	67.80	3.14	6.70	4.28	.....	.....	0.30	4.28	.....	.....
	3d	Down main line.	" '04	67.00	4.28	6.62	5.43	0.15	2.14	0.23	3.29	39.47	60.53
	3d	Siding.	Aug., '04	66.50	5.00	6.67	4.71	.....	.....	0.33	4.71	.....	.....
Altcar Rifle Range.	4th	Down main line.	Jan., '04	69.10	1.28	6.86	2.00	.....	.....	0.14	2.00	.....	.....
	3d	Down main line.	" '04	66.40	5.14	6.62	5.43	0.13	1.86	0.25	3.57	34.2	65.8
	3d	Siding.	July, '05	69.30	1.00	6.85	2.14	.....	.....	0.15	2.14	.....	.....
Formby .....	4th	Down main line.	Jan., '04	70.10	Nil.	7.00	Nil.	.....	.....	Nil.	Nil.	.....	.....
	3d	Down main line.	" '04	66.3	5.29	6.63	5.29	0.14	2	0.23	3.29	37.84	62.16
	3d	Down main line.	" '04	62.30	11.00	6.35	9.28	0.13	1.86	0.52	7.42	20	80
Southport .....	3d	Crossover road.	" '04	65.90	5.86	6.71	4.14	.....	.....	0.29	4.14	.....	.....
	4th	Down main line.	" '04	66.90	4.43	6.83	2.43	.....	.....	0.17	2.43	.....	.....

\*Near Ex. Station Junction.



## A SUGGESTION FOR TIE RODS.

BY H. HERDEN,

Chief Engineer, Buffalo &amp; Susquehanna.

It seems that in spite of many devices to replace the wooden tie with one of steel, stone or concrete, the wooden tie will stay with us for a long time yet, but we may have to strengthen or reinforce it, as we reinforce a concrete beam.

A wooden tie, even when new and sound, is very flimsy material compared to the strength of rail and rail-fastenings. Placing a tie-plate under the rail was a great improvement, and yet we have thousands of miles of nothing but frail fibers of wood between the rails, which wood is supposed to determine the gage of the track, but does not, since the gage is principally dependent on the soundness and resisting quality of the tie at the particular spot where the rail is fastened to the tie. We know what happens when a rail is subjected to lateral pressure from a heavy and fast moving load and

avoidable pressure against the rail increases with high speed, heavy loads and imperfect track.

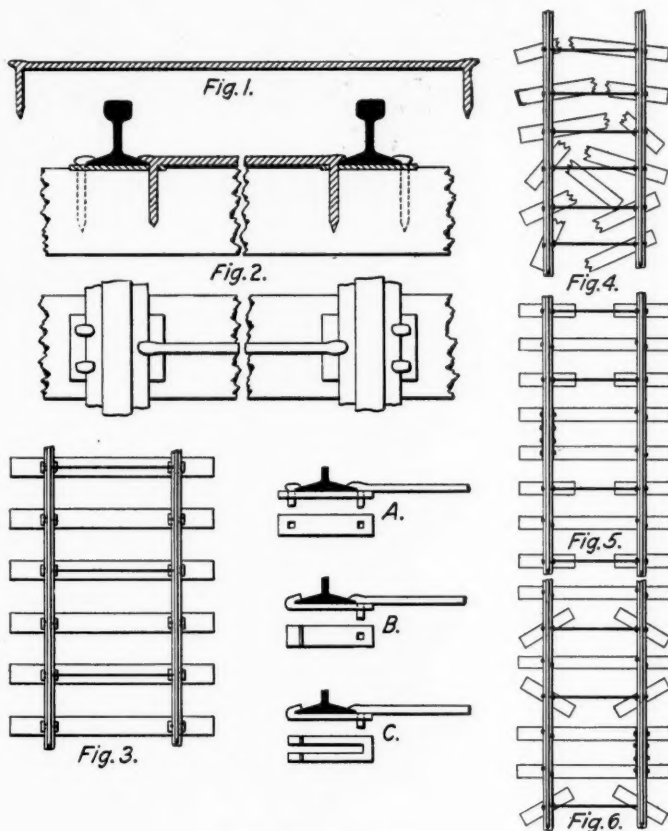
To prevent a rail from moving outwardly or better, to increase the factor of resistance, the maximum or limit of which we should be able to express in pounds (which we cannot, if the resistance depends on the fibers of a half-decayed tie), and to prevent the spreading of rails or extension of gage-distance, it is suggested to hook opposite rails together by means of a rod as shown in Fig. 1. This tie-rod consists of a straight piece of steel of rectangular or other section with bent ends that are to all intents and purposes two inside spikes integrally attached to rod. The spike-ends of this rod are inserted in inside holes of tie-plates of any preferred type, or plates made especially for this purpose, and then driven into the tie like any other spikes, with the difference, however, that such spikes as shown in Fig. 1 would go home more true than is usually the case. If, now, both rails are loaded and one of them should be subjected to lateral pressure from the wheel, the gage could not widen without breaking the rod or tearing up a tie-plate, which would certainly make detection of track spreading very easy, if it ever should occur. The tie-plate shown in Figs. 2 and 3 does not represent any particular type of plate and therefore only the general outlines of a tie-plate are indicated. It is evident that if such a tie-rod were used all spikes and plates at both ends of a given tie would combine to resist the outward motion of either rail and prevent the spreading of track within the limit of strength of metal employed. Lateral motion of rails would be reduced to a minimum if all parts were made to fit closely, and the result would be a track with uniformly parallel rails and permanent gage distance. Fig. 2 shows the compactness and simplicity of the device.

Fig. 3 would represent this tie-rod applied in main track, spacing of which would depend on the given conditions. In sharp curvature where it is the practice to increase the gage distance, rods of proper length corresponding to the increased gage distance would be used.

This tie-rod having its position on top of tie could not interfere with track work and could be applied or removed conveniently with the usual track tools. While it might take less time to drive the tie-rod home than it takes to drive two common spikes, it is quite possible that it would be more difficult to remove it in the same time it takes to pull out two spikes.

Fig. 4 with the tie-rods left out would give a fair representation of a mix-up as it sometimes will occur on the best regulated railway. The purpose of the tie-rod here would be to repair a wrecked track temporarily for slow speed in the shortest time possible, especially when new ties are a long distance away from the scene of wreck. If rails have not been injured, or only slightly, they may be hooked together very rapidly by means of this rod, using plates as shown in A, B or C, which, of course, are not tie-plates, strictly speaking. Such plates need not be stronger or heavier for this purpose than enough to equal the tensile strength of the rod. With plates B or C no spikes would be required for a temporary expedient. Every section might be equipped with a certain number of tie-rods for wrecking purposes; they could be easily carried on the hand car. Of course, any form of tie-plate would answer for wrecking purposes, but plates A, B or C, or plates similar to these would be cheaper, lighter and more easily and quickly applied, being perfectly flat and conveniently driven under rail. The tie-rod, being a gage in itself, would space the rails properly. Such rods with plates could be carried on trains for emergency purposes.

Fig. 4 suggests using short ties in side tracks, temporary tracks or storage tracks where the roadbed is well-seasoned, to save tie material; such tracks are shown in Figs. 5 and 6. Here short ties alternate with long ties. In Fig. 6 short ties slant at an angle of about 30 degs. to long ties. In either case the resistance to moving two opposite short ties laterally



Herden Tie Rod.

we will suppose, in this instance, that the outside rail in a curve is subjected to such action while the inside rail at the same time has only to resist a force acting in a vertical direction from the moving load. What happens then is that the outside rail has a tendency to move outwardly, being prevented by tie-plate and spikes, which in turn depend on the resisting quality of wood, which becomes weaker every day from age and service; while the vertical force acting on the inside rail is practically wasted so far as it might be applied in assisting the outside rail to resist that pressure. Either rail may be subjected to such lateral pressure and one might be pushed off entirely from the tie, tie-plate, spikes and all, without disturbing the opposite rail.

It follows, then, that if spikes and tie-plates offer a certain resistance to being moved laterally, this quality at both ends of the tie should be combined against either rail having a tendency to move outwardly. There is not much danger of rails moving towards center of track under traffic; all the difficulty is due to the flange of the wheel, and this un-

to track in the same direction would exceed the resistance of moving one long tie, and particularly so in short ties, Fig. 6. More short ties could be used in perfectly uniform solid roadbed for the tracks mentioned, and a great saving in tie timber should be effected by the plan, as renewal of ties would affect sometimes only one side of track, and instead of throwing away a long tie that is decayed or defective at one end only, timber equal to 33 per cent. of a long tie would be taken out.

There are many advantages this tie-rod would have over one with shoes or sleeves or one bolted to web of rail. A rod as shown in Fig. 1 may be used at any time and anywhere between rails in track where spikes at inside of rail can be driven. If not already provided with the usual tie-plate, any plate of approved pattern that has a hole at the inside of the rail intended for a spike may be used, while certain types of plates of improved pattern would further add to the efficiency of the tie-rod. If track, during certain seasons when ties cannot be removed conveniently, should show signs of spreading, or if other defects are discovered in ties, a few rods may be quickly applied in such spots to insure safety until ties can be renewed.

A tie-rod as described should not be expensive, and the cost of two inside spikes should be deducted from it, the labor saved in maintaining the gage of track and inspection of same should go far towards cost of material contained between the spike ends of the rod, without taking other advantages into consideration. The tie itself should last longer with this rod, for the lateral outward motion of the rail would be greatly checked by the load on the opposite rail, so that the widening out of spike holes in the tie should be prevented to a great extent. In connection with a properly constructed tie-plate closely fitting the flanges of the rail, this tie-rod would act to a certain extent as an anti-creeper device when ties have a tendency to assume oblique angles to rail.

As the labor of fastening this rod in track would be equal to labor of driving two spikes, which would have to be driven in any event, the cost of laying or driving the rod should not be considered.

The Russian Minister of Transportation, Schauffusz, has been succeeded by S. W. Ruchlov, a man who has spent his life in various government offices, of which that of marine and harbors is the most nearly related to his present duties.

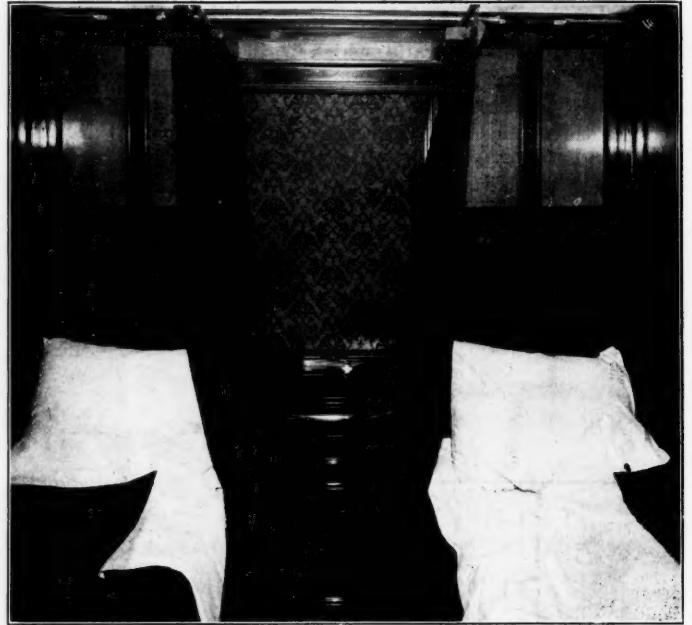
## ENGLISH RAILWAYS.

BY WILLIAM WICKHAM TURLAY.

### III.

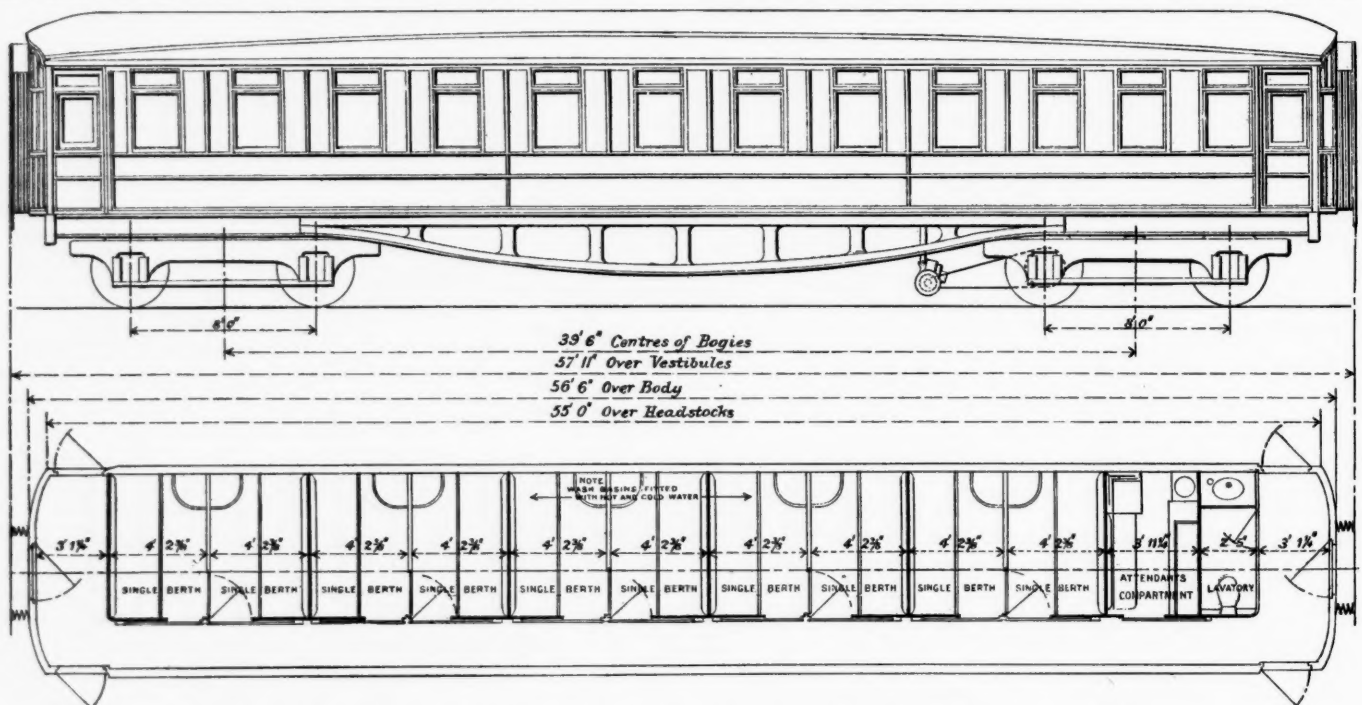
#### SLEEPING CARS.

English sleeping cars are all built with corridors and compartments, each compartment usually accommodating one person only, as there are no upper berths, though two adjoining



Two-Berth Compartment in Sleeping Car.

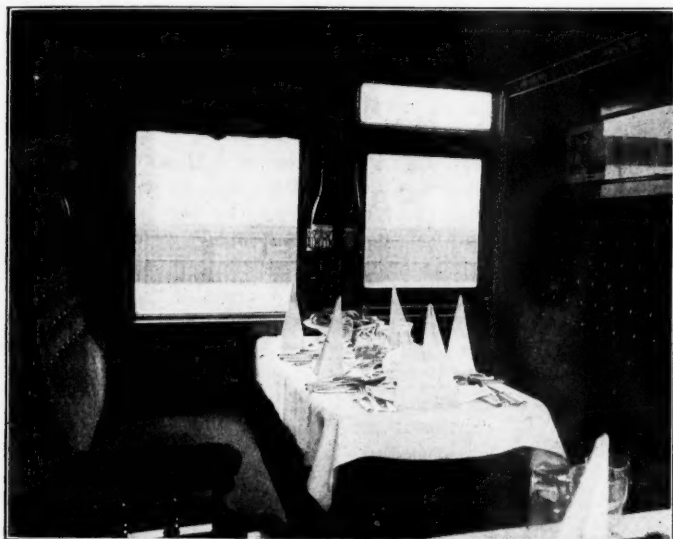
compartments can sometimes be connected by doors arranged for the purpose. There are toilet rooms at the ends of the cars and in addition each compartment has a wash-basin with hot and cold water. These cars are quite like the "Mann" sleeping cars, a few of which were built and introduced in America some years ago and afterwards bought by the Pullman Company, except that the Mann cars had an upper and



East Coast Joint Stock Sleeping Car. Built by the North Eastern Railway in 1906.



a lower berth in each compartment. The English sleeping cars are so much superior to the ordinary American sleeping cars, both in comfort and decency that no comparison need be made, but it must be remembered that the American cars each contain one or more staterooms, which afford privacy at a considerable advance over the usual charge. The charge per passenger for a night journey in an English sleeping car ranges from five shillings (\$1.20) to 7½ shillings (\$1.80), according to distance, and the passenger must also have a first class ticket, so that the actual cost of the compartment



Interior of Third Class Dining Car.

in the English sleeper for a traveler who would ordinarily ride on a second or third class ticket is greater than that of a berth in an American sleeper. Those who are unable or unwilling to pay so much are provided for by the railway companies in another way, as there is a system by which travelers of any class may rent pillows and rugs at six pence (12c. each) per night and may thus make themselves fairly comfortable at a small expense, especially if the ordinary compartments are not crowded. For this purpose the second and third class cars are really preferable, as the seats are not separated by arms and one can make himself very comfortable if able to lie down at full length on the seat cushions with his rug and pillow.\*

It may be added that sleeping and dining cars in England are owned and managed by the railway companies themselves.

#### DINING CARS AND LUNCHEONS.

English dining cars are usually subdivided for passengers of different classes and are clean and comfortable, though the interior decorations, which vary somewhat according to the class of the compartment, are not as elaborate as in American dining cars. The meals are served in courses and are good. The usual prices are:

Breakfast, 2s. 6d. = 60 cents.  
Luncheon, 2s. 6d. = 60 cents.  
Dinner, 3s. 6d. to 3s. 6d. = 72 to 84 cents.

The dining car waiter seems contented with a tip of three pence (6 cents) in place of the 25 cents which his colored brother in America looks for.

Basket luncheons are furnished at all important stations and

\*The Editor's experience is that the arms separating the first-class seats can be raised at will, removing all obstructions.

can be ordered in advance by wire, without extra charge, by notifying the train conductor (or "guard," as he is called) or the station officials, and will be delivered on the train at any one of certain designated stopping places, so that the passenger is enabled to choose his meal hour. The scale of prices is as follows:

- 6d. = 12 cents.—Pot of tea or coffee, with bread and butter.
- 1s. = 24 cents.—Pot of tea or coffee, with bread and butter, cake, jam and cress or lettuce.
- 2s. = 48 cents.—Cold roast beef, salad, fruit, bread and butter and cheese.
- 2s. 6d. = 60 cents.—Hot roast meat—steak or chops—with vegetables (or one-half of a cold roast chicken, with ham or tongue, in place of the hot meat and vegetables, as desired), salad, ice (or fruit), bread and butter and cheese.

At an additional expense of sixpence (12 cents) a bottle of mineral water, ale or beer, or a small bottle of light wine will be added. The luncheons are packed in small partitioned wicker-work baskets or hampers, with covers, which contain also dishes, napkins, knives, forks and spoons, salt and pepper. These hampers may be left in the train or handed out to a porter at any stopping place. Between the dining cars and basket luncheons, besides the dining rooms and lunch counters at stations, the traveler has a considerable range of choice, and is enabled to consult both his appetite and his pocketbook. Like a good many other things which are done by English railway managers (whether from a wise policy of under pressure of public opinion) for the comfort of the ordinary traveler, the system of basket lunches must involve a good deal of troublesome detail, with little or no direct profit, and it may reduce the receipts of the dining cars. It was tried in a very small way on one of our New England railways some years ago, but discontinued, and it is not as easy or pleasant to eat in one of our open and often crowded American cars, under the observation of many people, as in the comparative privacy of a compartment.

(To be continued.)

#### THE ARICA-LA PAZ RAILWAY.\*

Arica is the seaport town of Tacna, Chile, and has a population of about 3,000 inhabitants, communication being maintained between it through its port, with Valparaiso in the extreme south, and with Panama in the north.

Having already connected Arica with Tacna by railway, a distance of 39 miles, the Chilean government have long cherished the ambition of extending the line to La Paz in Bolivia, while the Bolivian government have been equally anxious, by this means, to get an outlet to the sea.

The enterprise to build this line, which has now been resolved on, will provide some engineering features of the greatest interest, since it will be necessary to drive it through or over the great mountain chain of the Andes, which shuts off Chile from the Argentine Republic and Bolivia. The first step in the general scheme of railway building in this territory was the Antofagasta and Bolivia Railway. The second was a connection with the Argentine system through the great spiral tunnel now being driven under the Uspallata pass, which will be opened to traffic in May of next year, admitting of the passage over the first trans-continental railway line in South America from the Atlantic to the Pacific. The third step will be the crossing of the Andes at one of the low passes above Copiapó to connect with the Argentine lines from Tucumán with the Bolivian system. Surveys have already been authorized, and work has been commenced upon this project. The fourth, and by far the greatest, engineering undertaking will be the Arica-La Paz line, the construction of which will cost the agreed sum of £2,334,395 (\$11,671,975).

The route will follow the Valley of Lluta from Arica to the Inn of Incara, a distance of 104 miles. This latter station will mark the highest elevation in the passage of the Andes, and will also form the crossing point for the proposed Tacna

\*Abstract from an article in *The (London) Engineer*.



Luncheon Basket.

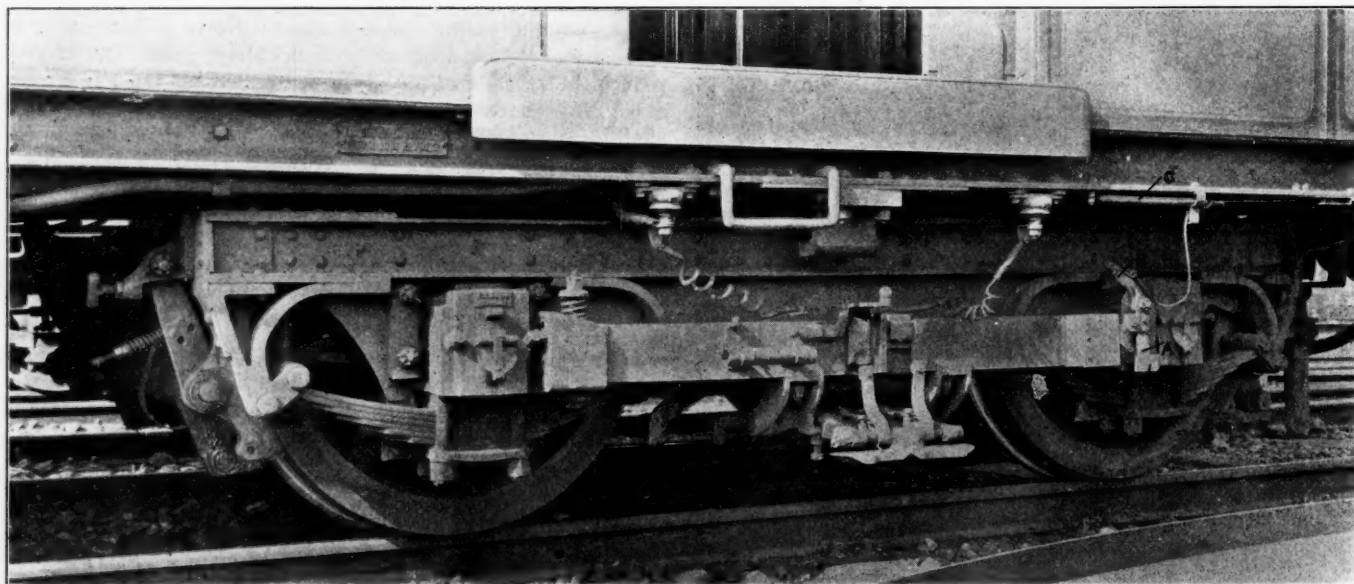
line. From the Inn of Incara the line will continue down to La Paz by a gradual decline a further distance of 188 miles, making the total 292 miles. The section between Arica and Incara will have an average gradient of 4.5 per cent., but at certain points, where a series of perpetual cascades of from 10 ft. to 15 ft. in height have to be followed, and measuring some hundreds of yards in length, the grade will be from 15 to 20 per cent. It has been found that by establishing a maximum gradient of 6 per cent. the greatest height of the line above the river will not exceed 160 ft.; and here the rack-rail system will be introduced. The minimum curve is 460 ft. radius, and there will be a considerable number of curves of about 500 ft. radius. In this section there will be 48 bridges and one viaduct, most of the former being built of stone arches of 15 ft. to 25 ft. span, while others will be of steel beams from 65 ft. to 100 ft. long. One bridge in particular will have to span a chasm of 150 ft. There will be 70 tunnels, with a total length of 5,000 yds., the longest being one of 175 yds.

The altitude of the Inn of Incara is 13,570 ft., and from here to La Paz there will be a down grade of some 1,660 ft. in 188 miles. It is expected that, taking the long steep climb and the subsequent descent into consideration, the 292 miles with passenger trains will take 14½ hours in transit. Be-

The railway will be built at the same time from Arica, in Chile, and Viacha, near La Paz, in Bolivia, and the line will be divided into five sections, each section having been tendered and estimated for separately. By terms of agreement with the governments of Chile and Bolivia respectively, materials of every kind, machines and tools for the construction of the railway will be exempt from all import duties and all government and city taxes.

#### ELECTRIC SAFETY DEVICE ON THE BERLIN ELEVATED & UNDERGROUND RAILWAY.

An extremely simple but important safety device in connection with the supply of power to electric motor coaches is provided on the Berlin Elevated & Underground Electric Railway installed and equipped by Siemens & Halske, of Berlin. In case of any accident which might result in danger to the passengers or personnel of the railway by reason of electric shock from the third or live rail, the voltage of which is 750 volts above earth, it is of the utmost importance that there should be no delay in cutting off the current at the generating station. This can be secured either by telephonic communica-



Truck Equipped With Safety Device; Berlin Electric Railway.

ginning at a point 50 miles above Arica and ending at a point 71 miles still higher, there will be six locations of the rack rail, and in the section where the steepest gradients occur the total length of the rack rail will be 19 miles.

Mr. Josiah Harding, M. Inst. C. E., who made surveys of the whole route on behalf of the Chilean government, reports fluctuations of temperature on the elevated part of the line from 13 deg. below zero at sunrise to 100 above at noon, a range of 113 deg. in a few hours.

It is proposed to take the water of the Llula river about 60 miles above its mouth for a hydro-electric plant and convey it by pipe line to a point about 1,000 yds. below, within which distance there is a vertical drop of 250 ft. It is estimated that this will furnish sufficient power to run the trains from Arica to Umapalca, nearly 100 miles, and within seven miles of the summit, the Inn of Incara. Additionally it would serve to operate the yards and wharves in Arica, light the city and supply all the necessary motive power which might be needed for many years to come.

The contract for building this line has been secured by a British firm, Sir John Jackson, Limited. The company has joined with Griffiths & Co. (contractors), Limited.

tion or by short circuiting the live rail so that the automatic switch in the generating station will open and remain open. In the latter case it may not be easy to find suitable means for producing an effectual short circuit, and delay may be caused at a time when every moment is of importance.

Messrs. Siemens have therefore made provision for producing a short circuit at a moment's notice and without the slightest danger to the operator. The apparatus is shown in the accompanying illustration and consists of a substantial switch mounted on one of the axle-boxes which carry the shoe beam. This switch is marked *A*, and can be operated by means of a cord attached to the lever arm, *B*. A flexible wire ending in a spring, *C*, connects this cord with a suitable handle in the driver's compartment. In case of necessity the driver by means of his handle can pull the switch, *A*, so that the switch blade comes into contact with the block, *D*. This block is mounted on insulating material and is permanently connected to the collector shoe. As soon therefore as the switch is pulled over, the third or live rail is connected through the collector shoe to earth, the switch being mounted on the axle-box without any intermediate insulation, and the short circuit so formed will be maintained until removed.



## General News Section.

The Pemigwasset House, the well-known hotel at the railway station at Plymouth, N. H., was destroyed by fire May 12, together with the station building. Loss \$100,000. The hotel was owned by the Boston & Maine.

Certain railways of Georgia have instituted proceedings to test the constitutionality of the state law requiring engines on main lines to be equipped with electric headlights. The court has referred the matter to a special master who will give a hearing May 24.

A press despatch from Winnipeg says that a final agreement has been reached by the Canadian Pacific and the leaders of the shop men, who have been uneasy for many months, and that all of the men who have been out of work since the strike of last fall are to be reinstated at their former wages.

Representative Bowers, of Mississippi, has introduced in Congress a bill directing the Interstate Commerce Commission to make a valuation of the physical property of the railways of the country and embodying a number of amendments to the Interstate Commerce law. It is proposed to put telegraph, telephone, private car and dining car lines under the Act to Regulate Commerce, and to provide for the automatic suspension of new tariffs issued by railway companies in case a shipper protests against the rates.

A press despatch from Atlanta, May 17, says that all of the white firemen and hostlers employed on the Georgia Railroad have struck as a protest against the employment of negroes by the company. It is said that this is the opening of the campaign by labor unions to destroy the negro as an industrial factor. An officer of the road says that the plan has been smouldering for five years. General Manager Scott says the strike has not interfered with train service. The strikers say the road is badly crippled. The engineers will not aid the striking firemen.

The new train of the Chicago & North Western and the Union Pacific between Chicago and Denver, which began running this week, and which traverses the 1,059 miles between those cities in 29 hours 30 minutes, enables a passenger to travel from Denver to New York, 2,023 miles, in 48 hours 10 minutes. The train leaves Denver at 7.20 a.m. and arrives at Chicago the second day at 1.50 p.m. The passenger may leave Chicago by the 18-hour train over the Lake Shore at 2.30 and arrive in New York at 9.30 a.m. the third day. Westward the new train leaves Chicago at 5 p.m.

Acting under a law recently passed, the State Railroad Commission of Indiana is about to issue regulations for carrying medical supplies on railway trains. The law requires each train to have a case containing two gauze bandages, two triangular pieces of gauze 18 in. wide, and one pound of absorbent cotton. At a conference held by the Commission with railway surgeons, at which 100 representatives of the railways were present, the doctors presented several objections to the law. Dr. Ford, of the C., C. & St. L., said the law was not necessary, for the railways run through thickly settled territory and "surgeons are more plentiful than patients." Cotton is not always the best thing to use on wounds. If carried it should be put up in small packages, say 2 oz. or 4 oz.

### Safety of Passenger Travel in 1908.

The Pennsylvania has published a summary of all accidents on the 11,235 miles of the Pennsylvania Railroad and controlled lines for the last calendar year, which shows that 141,659,543 passengers were carried and that not a passenger was killed as the result of an accident to a train. During the year the lines of the system carried 11,344,413 less passengers than in 1907—a loss of 7.4 per cent., but the total number of passengers injured in train accidents numbered only 102, a reduction of 452, or 81.6 per cent. from 1907; a striking illustration of the great increase in safety that has resulted from a moderate decrease in traffic. The figures suggest also how

large a percentage of passenger-train mishaps is due primarily to troubles with freight trains, for it was in the freight traffic, not the passenger, that the shrinkage of 1908 principally occurred. Freight train mileage fell off about 25 per cent., and passenger train mileage about 5 per cent. Assuming 100 as the number of trains that can be run over a road under reasonable conditions—conditions for which the tracks, cars, engines, stations, facilities and personnel are by ordinary standards adequate, it would seem, from the experience of dull seasons, that 80 trains can be run with a great increase in safety while to run 120 trains involves a great increase in danger; the saving, on the one hand, and the loss, on the other, being all out of proportion to the difference in the number of trains.

The figures here given include every case requiring surgical or medical attention, however trivial; but they show that only one person out of every 1,388,819 passengers carried was injured. The passenger mileage during the year was 3,457,671,462, so that for each passenger carried one mile the proportion was 33,898,739 carried in safety to one injured. The passenger-train mileage was 58,440,449 miles. The fact that the millions of passengers carried were handled with such safety is made more significant by the fact that alongside the passenger trains, freight trains performed 60,293,996 train-miles. Of the subsidiary lines, independently operated (included in the foregoing) the record of the Long Island road is most striking. That line carried during the year 23,242,838 passengers and only 17 were injured in train accidents. Passengers carried one mile numbered 352,228,060. This line has now a record of 15 years without a fatality to a passenger due to a train wreck.

### World's Largest Coal Company.

The Consolidation Coal Company, of Baltimore, has announced that negotiations have been completed for merging the Fairmont Coal Company, the Somerset Coal Co., the Clarksburg Fuel Co., the Pittsburgh & Fairmont Fuel Co. and their subsidiaries, all of which are now controlled by the Consolidation Co., including railways, floating equipment, docks and other property, thus creating one of the largest mining industries in the world. The companies own 200,000 acres of coal land in Maryland, West Virginia, Kentucky and Pennsylvania.

The capital stock of the combined companies is \$37,650,000, exclusive of bonded debt and capital of subsidiaries. The company recently increased the stock from \$10,000,000 to \$20,000,000, of which increase \$6,350,000 was disbursed as a 60 per cent. extra dividend and \$3,400,000 was held in the treasury.

### President Ripley on the Situation in the West.

On arriving in Chicago last week from California and other parts of the West where he had spent several months, E. P. Ripley, President of the Atchison, Topeka & Santa Fe, said:

"The western country is prosperous beyond all precedent so far as agriculture is concerned. Farmers have had a succession of big crops and big prices, and large areas of territory heretofore classified as arid are being profitably cultivated.

"The government irrigation work has also been immensely helpful and will be more so in the future in providing small farms of rich land. It is the only department of the government, by the way, that is conducted with some regard to business principles.

"The railways of the west have but one thing to fear—meddlesome and vicious interference in the conduct of their business by legislatures and commissions having no interest in the property and no knowledge of railway matters, elected not to do justice but for the sole purpose of getting as much as possible out of the corporations in increased service and reduced rates.

"As to the Santa Fe, it is making large improvements to

its existing lines and it is planning a few short branches in territories which are suffering for transportation, but is proceeding cautiously and will be ready to stop in case of further raids on it.

"I think that public sentiment has slightly changed and is less tolerant of persecutions of the railways, but there are some politicians who have not yet found this out."

#### Pennsylvania Railroad Forestry.

The Pennsylvania Railroad is planning to set out this spring more than 1,000,000 trees, making a total of 3,430,000 trees which have been planted in the last three years. Heretofore the company's forestry operations have been confined to a limited area between Philadelphia and Altoona. This year, however, 65,000 trees are being set out on tracts of land near Metuchen, N. J., and New Brunswick. There are to be planted within the next month 207,000 trees near Conewago, Pa., 186,000 in the vicinity of Van Dyke, 334,000 at Lewiston Junction, 7,000 at Pomeroy and 205,000 at Denholm.

Of the trees that are to be set out this spring 893,000 are red oak, 40,000 Scotch pine, 29,000 locust, 14,000 hardy catalpa, 14,000 pin oak, 5,000 European larch, 3,000 chestnut, 3,000 yellow poplar, 2,000 black walnut and 1,000 white pine. The bare places in the locust tree plantations, which were started some years ago, are being filled in with new seedlings, to follow as a second growth, after the older trees have been removed, for fence posts and other purposes.

The policy of encouraging reforestation on the part of the public has been actively pursued this spring. Some 151,000 trees have been furnished, practically at cost, to private corporations and individuals. In addition, 8,000 privet hedge plants have been supplied to private individuals. Privet hedge plants to the number of 7,000 are to be set out to ornament boundary lines along the company's right of way.

A special effort has been directed this season to growing ornamental shrubbery for use in parking the lawns around stations and unoccupied spaces along the roadway. To save the time required to grow these from seed, 6,000 plants have been imported from France. They will be placed in beds at the company's nursery at Morrisville, N. J. Part of them will be ready for transportation next year and the remainder in 1911.

At the Morrisville nursery alone approximately 1,250,000 trees have been dug, bundled and shipped to places along the railway. The area occupied by these trees has been plowed, fertilized and is to be replanted with about 200 bushels of acorns. Half a million coniferous seedlings, which were grown last year, are being set in transplant beds to remain for a year before being set out permanently. In addition to the above, there will be planted this spring about 100 lbs. of pine and spruce tree seed, which should produce about 1,000,000 plants. These in time will be transplanted to permanent locations.

#### United States Express Company.

Another suit has been brought against the officers of the United States Express Co. and against Thomas C. Platt, President, individually, to compel the opening of the books of the company for an inspection by representatives of certain stockholders. The articles of association, since this is not an incorporated company, provide that the officers need only call a meeting of stockholders in case two-thirds of the stockholders sign a request for such a meeting. At different times in the past there have been attempts made to get enough signatures of stockholders to compel a meeting but these attempts have been unsuccessful. The board of directors is a self-perpetuating body, and it is claimed that while the Platt family have been in control of the affairs and have received large salaries as officers, they have not held any large proportion of the stock, so that their interest in the earning power of the company is not of sufficient importance to outweigh advantages that they were able to obtain individually by giving business, for instance, to rival companies.

The original answer to the suit which is being brought by a Mr. Dudley says that James C. Fargo, President of the American Express Co., was made a director of the United States

Express in 1901, but says he is no longer a director. L. C. Weir, President of the Adams Express, was also at one time a director of the United States Express. Mr. Fargo until recently represented 10,000 shares of stock of the United States Express, but both this stock and 9,060 shares of the stock held by Mr. Weir, as President of the Adams Express, were sold a short time ago to Frank H. Platt. The shares at present held by members of the Platt family, as shown by the books, amount to 21,340 shares, of which President Thomas C. Platt holds but 100 shares. The total number of shares outstanding is 100,000. The officers of the company deny any other object in the management of the company than the promotion of the best interests of the stockholders, and claim a perfect willingness to hold a meeting for the election of directors if two-thirds of the stockholders request it.

The report made by the company to the Interstate Commerce Commission showed gross earnings for the year ended June 30, 1908, of \$16,983,638, and operating expenses of \$16,945,904.

The question of granting a peremptory writ of mandamus to compel E. T. Platt to permit an examination of the company's books has been set for argument on May 20.

#### The Improvement in Business.

The *Wall Street Journal*, New York, reporting the result of a large number of inquiries, concludes that industrial conditions, as a whole, are now decidedly hopeful. Following are condensations of its more important reports:

W. E. Corey—The United States Steel corporation is operating about 70 per cent. of normal capacity, and indications are for a continued improvement in prices as well as production.

General Electric Co.—The corporation, since February, has been receiving orders at the rate of between \$51,000,000 and \$53,000,000 a year, and that orders in the current fiscal year are likely to reach \$60,000,000, or equal to the boom year.

Republic Iron & Steel Co.—All the blast furnace capacity of the corporation is operating, and 75 per cent. of the finishing capacity.

Amalgamated Copper Co.—Sales of copper are large and at advancing prices.

Lackawanna Steel Co.—Operations close to 80 per cent. of capacity.

Westinghouse—More men at work than at any time since the panic.

American Smelting & Refining Co.—Big improvement in lead as well as copper, silver and other metals.

Allis-Chalmers Co.—Improving business.

American Steel & Wire Co.—Record-breaking orders have been received during the last two weeks.

Western Electric Co.—Large gain in business.

The International Harvester Co.—A normal business.

United States Cast Iron Pipe & Foundry Co.—Plants are running on a basis close to 85 per cent. of capacity.

#### Opening of the North Bank Line.

May 23 is the day announced for the opening of the Spokane, Portland & Seattle Railway from Portland, Ore., to Spokane, Wash. The line has been in operation from Portland to Pasco, on the Northern Pacific, about 240 miles, for several months, but now the remaining 150 miles into Spokane has been completed, and through Portland-Spokane trains will be installed for the entire distance on the new line, which is remarkably free from heavy grades and curves. At the same time the Northern Pacific's North Coast Limited, heretofore run from Portland via Tacoma to St. Paul in 72 hours, will be run direct from Portland to Spokane on the S. P. & S., or North Bank Line, thence to Chicago via the N. P. and the Burlington, making the first through service from the Pacific Northwest to Chicago over the N. P. The train will leave Portland at 9.15 a.m. and will reach Chicago at 11 a.m. on the third day, giving the same time as the Harriman lines. There will be two other through trains each way to St. Paul, and in addition one each way to Omaha and St. Louis, running over the Burlington east of Billings, Mont.

From Portland to Tacoma and Seattle there will be four local trains a day and four back. One of these will run solid



from Vancouver, B. C., through Seattle and Tacoma to Portland. This trip will take 12 hours.

The activity of the Hill lines both in giving through service to Chicago and also in running through trains into Vancouver follows the installation of the new "Soo-Spokane-Portland" train from St. Paul over the Soo, the Canadian Pacific and the Spokane & International to Spokane, and over the O., R. & N. into Portland. This new train runs from Portland to St. Paul in 65 hours, seven hours less than the present N. P. time. It is expected that heavy travel to the Seattle Exposition and Portland Rose Festival will justify the expense of running the new trains.

#### The Adams Express and the New Haven.

A question of considerable magnitude in the sum involved has arisen between the New York, New Haven & Hartford Railroad and the Adams Express Company which operates under contract throughout the whole New Haven system, where its gross business amounts to about \$5,000,000 yearly. The question turns on the interpretation of the contract in a clause relating to the express company's pro-rating on shipments to and from other railways, and the proportion to which the New Haven company is entitled. It is understood that the New Haven claims that a large sum is due it by the express company which has accumulated during a period of not less than 15 years.

In connection with the controversy, a preliminary step has been taken by the New Haven Company to secure a Connecticut charter to do an express business. This action seems, however, to be mainly a diplomatic move, as the road probably has that power already under its "omnibus" Connecticut charter, taken over from the Consolidated Railroad Company. This provides that the company may do any business "directly or indirectly connected with the business of transportation" and acquire properties and instrumentalities therefor.

The contract between the Adams Express Company and the New Haven runs for 10 years, beginning in 1905, and is terminable on a year's notice by either party at the end of the ten-year period. It provides for payments by the express company of 40 per cent. of its gross receipts on the New Haven system, the express company guaranteeing, however, an annual payment of \$1,250,000 as a minimum. If the gross business rises to \$3,750,000 or above the percentage rises to 45 and it is there now. The New Haven's percentage during the last fiscal year (1907-8) amounted to \$2,176,916. The "Adams Express" signs have been on the cars and stations of the New Haven road probably as long as any such signs have been on any railway in the country.

#### Increase of Street Car Fares in Philadelphia.

The Philadelphia Rapid Transit Co., on May 4, discontinued the sale of tickets giving six rides for 25 cents, the change having been found necessary because of the increase in the expense of running the lines. It is expected that, on the basis of the present business, the change will add \$2,000,000 a year to the company's gross receipts. In connection with the order making the change, the directors issued a statement giving their reasons, in which they say:

"During the past nine months the average fare received by the company has been about 3.90 cents. This sum is the result of the following distribution of all riders: 48 per cent. paying the full fare of 5 cents; 8 per cent., riding on exchange tickets, pay 4 cents; 31 per cent., riding on package tickets, pay 4½ cents; 13 per cent. ride on free transfers.

"It is absolutely necessary that the company increase its revenues for four reasons:

"(1) With this average per passenger it is doubtful if the company during the current fiscal year could, with the strictest economy, meet its operating expenses and fixed charges. During the next year it assumes an additional fixed charge of interest on the last half of the \$5,000,000 issue of bonds authorized last fall. This interest amounts to \$125,000 a year. In 1912 the company must begin the accumulation of a sinking fund at the rate of \$120,000 a year and steadily increasing. The payments to the city in lieu of street paving, increase each 10 years at the rate of \$50,000 per year, and at

a fixed amount per square yard of new streets occupied. The tendency of everything is to cost more, and if the company is to be operated without a deficit it must increase its revenues.

"(2) Economical operation means inferior service. With the additional revenue the company can and will give better service.

"(3) The directors of a corporation owe a duty to their own stockholders. They are the trustees for the \$30,000,000 of capital which has been paid into this company during the past seven years and expended in order to give the people better transportation facilities. Not a dollar of return has been received by these stockholders, and at present market rates their capital has been depreciated upwards of 25 per cent. The lost interest on this fund to our stockholders will amount, on July 1, 1909, to \$6,239,725.

"(4) Every public service corporation must grow with the city which it serves. The Rapid Transit system has raised on capital account and expended in this community in seven years \$42,500,000. A company which is not making money has no credit.

"Under the contract with the city it is provided that the stockholders shall first receive in dividends, before any distribution is made to the city, 6 per cent. on the moneys paid in by them, dating from Jan. 1, 1907. Already there is accumulated under this provision of the contract over \$6 per share, or (gross) \$3,827,225. As an evidence of the good faith of this company, and as a proof that its purposes are not merely to enrich its stockholders, we will recommend to our stockholders that they shall surrender all accumulated dividends on their stock to which they are at present entitled up to July 1 of the current year; also that hereafter the dividends shall not be cumulative, but shall be paid and divided under the contract only from year to year as earned.

"This is the offer of the board of directors, subject to the consent of the City Councils on the one side and the stockholders on the other."

#### Changes in Train Service of Western Roads.

A number of the western lines have made, or soon will make, numerous changes in their passenger train service. Several new trains are being put in service on account of the Alaska-Yukon-Pacific Exposition, and this has made it necessary to make comprehensive changes in local schedules.

The changes on the Hill lines will become effective on May 23. The Burlington train No. 43 will continue to leave Kansas City at 6.05 p.m., will leave Lincoln at 1.45 a.m. instead of 2.05 as at present, and will leave Billings at 6.30 a.m. instead of 9.20 a.m. as at present. It will run from Billings to Seattle over the Great Falls line of the Great Northern, reaching Seattle at 10.50 p.m. No. 44, eastbound, will leave Seattle at 10 p.m. over the Great Northern, leaving Billings at 6.30 p.m. of the next day and arriving at Kansas City at 8.15 a.m. The Oriental Limited of the Great Northern will be extended to Chicago over the Burlington. It will leave Chicago at 10.15 p.m. and reach Seattle at 8.15 p.m. of the third day. Eastbound, the Oriental Limited will leave Seattle at 7.10 p.m. and arrive at Chicago 9.10 p.m. of the third day. There will also be through trains between Chicago and Seattle over the Burlington and the Northern Pacific. No. 51, the Northern Pacific Express, will leave Chicago at 9.20 a.m. and St. Paul at 10.15 p.m., and will reach Seattle at 12.30 p.m. of the third day. No. 50, the North Coast Limited, will leave Seattle at 9 a.m., arriving at St. Paul at 10 p.m. of the second day, and reaching Chicago at 11 a.m. the third day. The Burlington's No. 13 will leave St. Louis at 2.15 p.m. as at present, but it will reach Denver at 4.15 p.m. instead of at 6.20 p.m. as at present. The Burlington is putting on its through trains many additional electric lighted cars.

The Harriman lines and their eastern connections, the Chicago & North Western and the Chicago, Milwaukee & St. Paul, are also making marked improvements in their passenger service. Parts of the Overland Limited of the Union Pacific run to and from Chicago both by the Chicago & North Western and the Chicago, Milwaukee & St. Paul. The Overland Limited's time of leaving Chicago has been changed from 6.05 p.m. to 5 p.m., and it will reach San Francisco an hour earlier. It will leave San Francisco at 11.50 a.m. instead of at 10 a.m.,

and will arrive in Chicago over both the North Western and St. Paul at 1.50 p.m. of the third day, instead of at 12.30 p.m. The Chicago & North Western and the Union Pacific have also put on a new train to be known as the Chicago-Portland Special. It will leave Chicago daily at 10.01 p.m., westbound, arriving in Portland the evening of the third day; eastbound it will arrive in Chicago at 11.59 a.m. The North Western has also put on a new train which will have through sleepers between Chicago and Omaha, Des Moines and Sioux City. It will leave Chicago at 6 p.m. and arrive at Des Moines at 6 a.m., at Omaha at 8.23 a.m., and Sioux City at 9.20 a.m.

The Chicago, Milwaukee & St. Paul, in addition to the changes already mentioned, has reduced by nearly an hour the running time of some of its trains between Chicago and St. Paul. The St. Paul has also put on a new fast mail train, which leaves Minneapolis at 9 p.m. and reaches Chicago at 10 a.m.

The new service over the Wabash and the Union Pacific, from St. Louis to the Pacific Coast, which has been heretofore mentioned in these columns, was installed on May 8.

#### Fast Life in New York.

The New York State Public Service Commission, First district, has ordered the Interborough Rapid Transit Co. to convert 50 cars into end side door or center side door cars, as the company may choose, by August 15, and thereafter to equip two eight-car trains each month, and to continue the reconstruction of the cars at this rate until all the express trains are so equipped. The company is also ordered to provide new cars with side doors prior to October 15, 1909, so that by that time it will have sufficient cars to run express trains each way every 90 seconds during the rush hours.

#### General Railway Signal Company.

The report of the General Railway Signal Co., Rochester, N. Y., for the year ended December 31, 1908, shows gross profits on sales and contracts of \$260,663, as compared with \$453,073 in the prosperous year of 1907. Net earnings, after all expenses and operating disbursements, were \$47,344, a decrease of \$165,529. Interest and depreciation charged to factory equipment amounted to \$66,447, a decrease of \$36,011. Dividends were \$60,000, half of that paid in the previous year. The surplus on January 1, 1908, had been \$48,083 and the reserve account on that date was \$33,238. These sums, combined with the net earnings of the year 1908, enabled the company to pay the above interest, depreciation and dividends, leaving a surplus reserve on December 31, 1908, of \$2,218.

The balance sheet as of December 31, 1909, shows cash on hand of \$60,541, a decrease of \$14,354, and bills and accounts receivable \$262,115, a decrease of \$376,912. The material in stock, in process and in course of installation on contracts and sales, is carried at \$902,238, a decrease of \$71,808. Machinery, tools and fixtures, together with factory buildings, land and improvements, aggregate \$1,353,559, an increase of \$2,411. Patents, including Young system, are carried at \$3,269,350, an increase of \$48,112. Under liabilities, bills and accounts payable are \$352,169, a decrease of \$350,728. The bonded debt is \$623,000, the preferred stock \$2,000,000 and the common \$3,000,000. The company had on hand at the time of the annual meeting, not included in the business of 1908, contracts aggregating over \$1,100,000, which had been, and were still, held in suspense until the railways were in a position to go ahead. The total yearly capacity of the company's plant is over \$5,000,000.

Thirty-one students of the University of California, composing the university's Glee and Mandolin Club, are being taken over the lines of the Atchison, Topeka & Santa Fe to give entertainments to the employees of the roads at the clubs that the company maintains at its various division headquarters.

Near Mead, Wash., 14 miles from Spokane, on the night of May 15, the mail car on a train of the Great Northern was stopped and robbed, and the robbers caused a collision, injuring a dozen passengers. They detached the engine and mail car and ran them forward some distance, and, after completing their robberies, started the engine and car back, un-

attended, toward the other part of the train, which was struck at considerable speed. None of the injuries were fatal.

The supposedly conservative state of Massachusetts is emulating the wild west, and the lower house of the legislature, after a heated debate, has ordered to a third reading a drastic bill to penalize railway officers for breaking the state laws. This action was taken after the House, by a vote of 11 to 160, had rejected an amendment to strike out of the bill the imprisonment feature. The penalty for violation of the corporation laws is a fine of not more than \$1,000 or imprisonment for not more than one year, or both fine and imprisonment.

#### American Association of Local Freight Agents' Associations.

The annual convention will be held at Albany, N. Y., June 22, 23, 24, 25, 1909. G. W. Dennison, Penna. Co., Toledo, Ohio, is Secretary.

#### Chief Joint Car Inspectors and Car Foremen's Association.

The annual convention will be held at Buffalo, N. Y., September 15 and 16. Stephen Skidmore, of the Cleveland, Cincinnati, Chicago & St. Louis, at Cincinnati, Ohio, is Secretary.

#### New York Railroad Club.

At the meeting on May 21 the paper for this occasion will be by Julius Kruttschnitt, Director of Maintenance and Operation of the Harriman Lines, on The Operating Organization of the Union Pacific and Southern Pacific Systems.

#### American Society of Civil Engineers.

At the meeting held on May 19, two papers, The Sewer System of San Francisco and a Solution of the Storm-Water Flow Problem, by C. E. Grunsky, M. Am. Soc. C. E., and Some Extensive Railway Surveys, and Their Cost per Mile, by W. S. McFetridge, M. Am. Soc. C. E., were presented.

#### Railroad Industrial Association.

The Railroad Industrial Association held its third annual convention at Cincinnati May 11. Memphis was chosen as the place for the next convention and the following officers were elected: President, R. E. Wilson, Atchison, Topeka & Santa Fe; Vice-President, C. J. Hupp, Michigan Central; Secretary, Guy L. Stewart, St. Louis South Western, St. Louis; Treasurer, L. L. Lawrence, Laurel, Miss.

After the business session the local committee escorted the delegates on a sight-seeing tour of the city, concluding at Chester Park, where dinner was served. It is expected that the membership will be largely increased during the coming year through the establishment of industrial and commercial development departments by a number of roads that have never maintained them.

#### The Railway Storekeepers' Association.

The sixth annual convention of the Railway Storekeepers' Association was held at the Auditorium Hotel, Chicago, on May 17, 18 and 19. The committee on "Recommended Practices," Chairman, N. M. Rice, General Storekeeper of the Santa Fe, reported on the most practical store department organization; on tools and supplies furnished locomotive and train crews; what can be done to reduce the expense; and the value of pricing requisitions before purchasing. The Committee on "Classification of Material," Chairman, F. D. Reed, General Storekeeper of the Rock Island, next reported. The papers presented related principally to lumber. Dr. Herman Von Schrenk, Supervisor of Timber Preservation of the Rock Island, read a paper on the "Treatment of Lumber and the Handling of Same before and after Treatment." This paper was illustrated by stereopticon views and was an interesting presentation of the subject by a well known authority. The author treated briefly on the cause of decay and methods of preventing it and the proper method of piling lumber of different sizes in order to prevent decaying. He presented illus-



trations of creosoted ties which had served as a fence 30 years in England, and gave directions as to proper method of handling ties and also lumber after being creosoted.

On Tuesday morning J. M. McCarthy, Purchasing Agent of the Rock Island, read a very interesting paper on "Uniform Grading and Inspection of Lumber." This paper gives in an appendix references to various rules for grading lumber and quite voluminous notes showing the different interpretations that are placed on the rules by different railways.

Another paper on the "Uniform Grading and Inspection of Lumber" was read by J. W. Justis, of the Justis Lumber Company. These two papers led to a lively discussion. It was hoped that the lumber dealers could be induced to take an active part in it, but those present were not so disposed.

The papers were discussed more fully by J. W. Waterman, Storekeeper of the Burlington at Lincoln, Neb., and by G. G. Yoemans, Assistant to the President of the Wabash.

W. F. Goltra, of the New York Central, presented a paper on the "Comparative Cost of Ties and Lumber on the New York Central Lines West of Buffalo During the Past Twenty Years," including tables giving the cost of lumber in different years, and diagrams illustrating the variation in price of different grades of lumber for the period from 1888 to 1908.

Among the other subjects discussed were "Prompt and Safe Transportation of Company Materials Other Than in Supply Car," introduced by T. W. Flannagan, General Storekeeper of the Soo Line; and "Minimum Stock, How Influenced by Prompt Purchase and Delivery," introduced by J. R. Mulroy, General Storekeeper of the Frisco.

Various small supplies were on exhibition in the hotel, and the usual entertainments were furnished for the ladies by the Supply Men's Association.

#### Convention of Engineers at Harrisburg.

Arrangements are being made for a three days' convention of engineers in the state Capitol at Harrisburg, Pa., June 9, 10 and 11. There will be lectures on sewage, bridges, highways, mining engineering, explosives, forestry, water power, combustion, steel rails, application of electricity and other engineering subjects.

This movement is being carried out for the benefit of engineers throughout the state of Pennsylvania, and with a view to enlisting the interest of all such; but the operations are being carried on within the charter of the Engineers' Society of Pennsylvania, which has a club house in Harrisburg and has about 900 members. The President of this society is F. Herbert Snow, and the Secretary, J. H. Myers. It is proposed to organize and elect officers in the afternoon of the first day (Wednesday); on Thursday there will be lectures both morning and afternoon, and also in the forenoon of Friday. On Wednesday evening there will be an entertainment, and on Thursday evening an illustrated lecture on the Panama Canal by A. P. Davis or Colonel W. F. Hodges. There will be excursions in and about Harrisburg, and entertainment will be provided for ladies.

#### American Railway Association.

The spring meeting of the American Railway Association was held in New York City on Wednesday of this week, 158 delegates being present. The revised Articles of Organization and By-laws as recommended by the Executive Committee were adopted to take effect at once. The Committee on Train Rules presented a number of questions respecting practice under the Standard Code which have been submitted to it and the replies made thereto, which were approved by the association.

The Committee on Safety Appliances reported that its available time has been spent in connection with the work of the Joint Committee on Interlocking and Block Signals. Of a total of 2,182,476 freight cars 2,137,726, or 96.9 per cent., were equipped with air-brakes on January 1, 1909.

The Joint Committee on Interlocking and Block Signals presented a revision of the Block Signal and Interlocking Rules, which was adopted.

The Committee on Transportation of Explosives presented a revised code of rules for the transportation of explosives and inflammable articles and acids, which were approved.

In the regulations for the transportation of inflammable articles and acids the labels are modified and the test flash-point for inflammable liquids is reduced from 100 deg. to 80 deg. In connection with these changes certain incidental modifications in practices and language were made.

The Committee on Standard Location for Third Rail Working Conductors presented a report of progress.

The Committee on Car Service reported several changes in the code of demurrage and per diem rules, which were adopted. The McCrea commission, which has been considering the question of per diem rates on freight cars, was not ready to report.

F. A. Delano (Wabash) was re-elected President, and W. G. Besler (C. N. J.) Second Vice-President, and T. E. Clarke (D. L. & W.) and G. L. Peck (Penn. Lines) members of the Executive Committee. Members of the Committee on Train Rules elected were the Boston & Maine, Hocking Valley, Pennsylvania.

The next meeting will be held in Chicago on November 17.

#### MEETINGS AND CONVENTIONS.

*The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.*

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
- AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, O.; June 22-25; Albany, N. Y.
- AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
- AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago.
- AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—R. E. Wilson, Ry. Exchange, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 29-July 3; Atlantic City.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St.; N. Y.; 1st and 3d Wed., except July and August; New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
- AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June, 1910; Colorado Sp'gs.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.; May 26-28, 1909; Detroit, Mich.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago; June 23-25, 1909; Detroit.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.
- INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; June 21-23, 1909; Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago; June 1-5; Chicago.
- IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.
- NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
- NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; June 8, New York.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago; Sept. 7-8; Fort William Henry, Lake George, N. Y.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
- SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R.L., East Buffalo, N. Y.; September, 1909; Denver.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St.; Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago, 1st Wednesday, except July and August; Chicago.

## Traffic News.

The Missouri, Kansas & Texas, acting on the advice of its legal department, has announced that it will raise its passenger rates in Missouri to 3 cents a mile on May 25. The Atchison, Topeka & Santa Fe restored the 3-cent rate on May 17.

The Trunk Line Association has authorized merchants' reduced fares to New York City for the coming fall buying season. The special fares—one fare and a half for the round trip—will be in effect July 17-20, August 14-17, August 28-31 and September 11-14, with the usual 15 day return limit.

The Committee on Railroads of the Missouri Senate has reported adversely an anti-pass bill that is backed by the state administration. The Missouri legislators seem more anxious to pass measures to reduce the rates of the railways than they do to enact a law that will prevent the roads from giving the law-makers free rides.

A meeting of the Central Passenger Association was held in Chicago on May 4 to reconsider the decision to make reduced rates to eastern summer resorts and the announcement of the differential lines that they would make proportionate reductions to New York City. No decision was reached in regard to the matter and another meeting will be held.

One of the tariffs recently filed with the New York State Public Service Commission, Second district, by the New York Central, is one providing for second-class party fares, for ten or more persons traveling on one ticket, from New York City to various local stations at 1½ cents a mile; also to various stations on the Delaware & Hudson and certain Adirondack points.

In the federal court at New York City, May 12, the New York Central & Hudson River paid \$136,000 in fines. These fines are those imposed in the sugar rebating cases, which were tried many months ago, on indictments found in 1906, but were appealed to the United States Supreme Court, where the decision of the lower court against the road was finally upheld.

In the city of Los Angeles there are more than 400 industries which have private tracks connecting with the railways, and the merchants of the city, proud of their enterprise, are claiming that in few or no other cities in the country are there so many industries possessing such facilities. The merchants have been complaining to the Interstate Commerce Commission that the switching charges made by the railways are too high, and the commission has been sending spies to the yards to find out what they can about the magnitude of the work and how much time it takes.

The Erie has filed notice with the Interstate Commerce Commission that from June 1 to September 30, it will sell round trip tickets from Chicago to New York for \$25.50, a rate which is on the basis of a fare and a third, plus \$1.50. The low east-bound rates noticed last week as announced for the month of June are thus extended over the whole summer. The other differential lines will undoubtedly follow the Erie. For the last few years there has been considerable of this class of business by reason of rate reductions made to the coast resorts direct. These rate reductions were often so extreme that a traveler from Chicago could reach New York via Atlantic City or Asbury Park for less money than if he had come direct; and this the Erie proposes to stop; though there may be conferences looking to a consideration.

### Traffic Club of Chicago.

A party composed of members of the Traffic Club of Chicago and their friends made a trip on a special train on the Lake Shore & Michigan Southern from Chicago to Gary, Indiana, on May 18. The train left the La Salle street station in Chicago at 10.30 a.m. and arrived at Gary at 12.30 p.m. and luncheon was served at the Gary Hotel. The party then made a tour of the town and of the plants of the Indiana Steel Company and of other manufacturing concerns.

### Proposed Uniform Code of Demurrage Rules

As announced in this paper last week, page 1041, the National Association of Railway Commissioners proposes to adopt or recommend demurrage rules applicable to all traffic throughout the country, and a hearing is to be given in Washington June 4 and 5. The code as tentatively adopted by the subcommittee is printed below. The full committee on this subject consists of Interstate Commerce Commissioner Lane and of one representative from each of 40 states. The subcommittee, which has drafted the code, consists of Mr. Lane, John Y. Boyd (Pa.), Andrew F. Gates (Conn.), John A. Webb (Miss.), William F. Rhea (Va.) and Halford Erickson (Wis.).

#### PROPOSED DEMURRAGE RULES.

##### RULE 1.—Cars Subject to Rules.

Cars held for or by consignors or consignees for loading, unloading, forwarding directions or for any other purpose, are subject to these demurrage rules, except as follows:

- (A) Cars loaded with company material for use of and consigned to the railway company in whose possession the cars are held.
- (B) Cars loaded with live stock.
- (C) Empty cars placed for loading coal at mines or mine sidings, or coke at coke ovens.
- (D) Empty cars held on carrier's or private tracks, provided such cars have not been placed for loading.

NOTE.—This will include private cars.

(The committee has not formulated rules governing demurrage on private cars.)

##### RULE 2.—Free Time Allowed.

(A) Forty-eight hours free time will be allowed for loading or unloading on all commodities.

(B) Twenty-four hours free time will be allowed:

- 1. When cars are held for reconsignment.
- 2. When cars destined for delivery to or for forwarding by a connecting line are held for final or amended instructions or for payment of freight charges.
- 3. When cars are held in transit and placed for inspection, grading, or change of destination.
- (C) When cars are interchanged with industrial plants performing their own switching service, handling cars for themselves or other parties, an allowance of 24 hours will be made for switching in addition to the regular time allowed for loading and unloading. If cars are reloaded after being unloaded, an additional 48 hours free time will be allowed.

(D) Cars held in transit for milling, cleaning, bagging, compressing, completion or change of load, under a through rate from the original shipping point to the final destination, with or without a stop-over charge, and detained over 48 hours, will be subjected to the demurrage charge. If such shipments are transferred to other cars, demurrage will follow on the cars into which transfer is made.

(E) Cars containing freight in bond will be allowed 48 hours free time for unloading from first 7 a. m. after permit to receive goods is issued to consignees by United States collector of customs.

NOTE.—Cars containing freight consigned locally to ocean, gulf, or lake ports, for coastwise or export movement via vessel will be allowed such free time as may be provided in the tariffs of the carriers.

##### RULE 3.—Computing Time.

NOTE.—In computing time, Sundays and legal holidays will be excepted.

(A) Time will be computed from the first 7 a. m. after cars are placed on public delivery tracks for loading.

(B) Time will be computed from the first 7 a. m. after notice to consignee of arrival when cars are held for orders, or from the first 7 a. m. after notice and placing on public delivery tracks when cars are held for unloading.

NOTE.—When notice is given by mail, time shall be computed from the first 7 a. m. thereafter, provided notice is deposited in United States mail on or before 12 m. of the day it is so deposited. When notice is deposited after 12 m. time shall be computed from the second 7 a. m. thereafter.

(C) On cars to be delivered on any other than public delivery tracks time will be computed from the first 7 a. m. after actual or constructive placement on such tracks.

(D) On cars to be delivered on interchange tracks of industrial plants performing their own switching service, handling cars for themselves or other parties, the time will be computed from the first 7 a. m. following delivery on such interchange tracks until return thereto.

##### RULE 4.—Notification.

(A) Consignee shall be notified in writing by carrier's agent within 24 hours after arrival of cars and billing at destination, such notice to contain car initials and numbers and the contents, and, if transferred in transit, the initials and number of the original car.

(B) When cars are ordered stopped in transit consignee shall be notified upon arrival of cars at point of stoppage.

(C) Delivery of cars upon private or interchange tracks, or notice to



consignee of readiness to so deliver, will constitute notification thereof to consignee.

**RULE 5.—Placing Cars for Unloading.**

(A) When delivery of cars consigned or ordered to private tracks cannot be made on account of inability of consignee to receive, delivery will be considered to have been made when the car was tendered. The agents must give written notice of all cars they have been unable to deliver because of the condition of the private tracks, or because of other conditions attributable to consignee. This shall be considered constructive placement.

(B) When delivery cannot be made on specially designated public delivery tracks on account of such tracks being fully occupied, or from other cause beyond the control of the carrier, the delivery will be made at the nearest available point.

**RULE 6.—Cars for Loading.**

(A) Cars for loading will be considered placed when such cars are actually placed, or held on orders of the consignor. In the latter case, the agent must give written notice of all cars which he has been unable to place because of condition of the private track, or because of other conditions attributable to the consignor. This will be considered constructive placement.

(B) When cars are reloaded after unloading, each operation will be considered as independent of the other.

(C) When empty cars, placed for loading on orders, are not used, demurrage will be charged from the first 7 a. m. after placing or tender until released, with no time allowance.

**RULE 7.—Inability of Connection to Receive.**

When a railway is unable to receive cars in switching service tendered by a connection to be placed for delivery, owing to the inability of the consignee to receive, it will promptly notify the line offering, in order that notice may be given the consignor or consignee and other disposition requested. Notice will be promptly given the consignee by the road offering the car and 24 hours allowed the consignee for its disposition.

**RULE 8.—Demurrage Charge.**

After the expiration of the free time allowed, a charge of \$1 per car per day, or fraction of a day, will be made.

**RULE 9.—Claims.**

When demurrage charges accrue under these rules from causes named below, such charges shall be canceled or refunded.

**Causes.**

(A) When the condition of the weather during the time prescribed for loading or unloading cars is such as to render it impossible to place freight in cars or to move it from cars without serious damage to the freight, or when shipments are frozen so as to prevent unloading.

(B) When, because of high water or snowdrifts, it is impossible to get to cars for loading or unloading.

(C) When, as a direct result of the act or neglect of a carrier, cars for one consignee to be unloaded at the same point, and transported via the same line, are bunched in transit and delivered in accumulated numbers in excess of the total capacity of consignee to unload within prescribed free time, evidence to be presented to the carrier's agent before the expiration of the free time. The measure of the capacity of the consignee to unload will be the total number of cars he can unload in one day under normal conditions.

(D) Delayed or improper notice by carrier.

NOTE.—When notice has been given in substantial compliance with the legal requirements as specified by the rules, the consignee shall not thereafter have the right to call in question the sufficiency of such notice unless within 24 hours after receiving the same he shall serve upon the delivering carrier a full written statement of his objections to the sufficiency of said notice.

(E) Railroad errors or omissions.

**Revision of Trans-Continental Freight Rates.**

On May 14 traffic officers of the Hill and the Harriman lines appeared before the Interstate Commerce Commission at Washington to outline the plan of revising transcontinental freight rates which the roads propose to adopt. In its decision in the Spokane rate case the commission said that the carriers might if they wished present to it some scheme for the revision of their rates and if this were approved the commission would vacate its order in that case. However, when the officers of the Hill and Harriman lines appeared before it the commission declined to take any action because the shippers interested were not represented.

The railway officers do not believe that any adjustment can be made which will satisfy the various commercial interests, and they have therefore decided to go ahead and make a readjustment of rates along the line of the order issued by the commission in the Spokane case, and let the shippers then object if they see fit to do so. The result will be a general reduction of rates from the territory east of the Missouri River to the territory west of the Missouri River except that

the existing rates to the Pacific Coast terminals will not be changed. It is understood that the basis of the re-adjustment will be the principle that rates to an intermediate point, such as Spokane, or Salt Lake City, shall not be higher than to the Pacific coast, except perhaps, in the case of rates on commodities on which water competition is especially severe. Not only will the rates to such points as Spokane and Salt Lake City be reduced to the basis of rates to the coast, but rates will be "scaled back," so that the rate will not be higher for a longer than for a shorter haul where this can be avoided.

The traffic officers of the Hill and Harriman lines have been in conference in Chicago this week working out the details of the readjustment. After the plan of readjustment has been agreed upon the specific rates will have to be figured by the rate clerks. It is thought that it may be possible to have the new tariffs ready for filing by July 1.

The reductions ordered by the commission in rates to Spokane amounted to about 16% per cent. The reductions which the railways propose to make will average, it is believed, about 15 per cent., although in some instances they will be greater.

That there is going to be difficulty in getting shippers to assent to the readjustment is shown by the attitude that already is being assumed by the jobbers in California. W. R. Wheeler, Manager of the Traffic Bureau of the Merchants' Exchange of San Francisco, has telegraphed to the Interstate Commerce Commission asking that it withhold its approval of the new rates until the coast cities can be heard. The Commission has postponed its order in the Spokane case, as to the Union Pacific System and the Chicago & North Western.

**Interurbans to Handle Baggage.**

Representatives from twelve interurban railways in Indiana held a conference in Indianapolis, May 11, and agreed to handle and exchange baggage, and maintain such service on the same basis as is now in vogue on the steam roads of the state, in respect to free and excess baggage. Service to commence June 15.

**An Eastbound Homeseekers' Special?**

If the railways running to the East had as much enterprise as those running to the West, there would be a drift of farmers from the high-priced lands of the West eastward which would go far to equalize the value of lands of similar quality East and West. There are lands in some of the better portions of New York and the New England states, corresponding in value to the farms in the West and with better improvements, that sell for little more than half the money. —Country Gentleman.

**Financial Depression in Korea.**

A Seoul, Korea, paper says that, on account of decreased traffic, passengers as well as freight, the nightly express from Seoul to Fusan, where it connects with ferry service to Japan, will henceforth run only every second night, with a corresponding decrease in the ferry service. The Seoul newspaper attributes the drop to the effects of financial bad times. The through train between Fusan and New Wiju will continue to run to facilitate connection with the Manchurian railways.

**INTERSTATE COMMERCE COMMISSION.**

Because a delivering carrier sees fit to state that it will protect a rate made by its competitor, but fails to do so, the commission cannot hold that such lower rate is necessarily reasonable. (16 I. C. C. Rep. 144.)

Reparation awarded on account of imposition of an unreasonable freight charge on a shipment of corn from Bates, Ill., to Detroit, Mich., because of carrier's failure to supply a car of the size ordered by the complainant. (16 I. C. C. Rep. 208.)

Exaction of double merchandise rates for the transportation of small live animals in secure containers, and when such animals do not require feeding or watering en route, found to be unreasonable. Merchandise rates should apply. (16 I. C. C. Rep. 214.)

## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MARCH, 1909.

(See also issues of May 7 and 14, 1909.)

MONTH OF JANUARY, 1909.														
Name of road.	Mileage operated at end of period.	Operating revenues				Operating expenses				Net operating revenues (or deficit).	Outside operations, net.	Total.	Taxes.	Operating (or dec.) income comp. with last year.
		Freight.	Passenger.	Inc. misc.	Total.	Way and structures, equipment.	Maintenance of way and structures.	Traffic.	Trans- portation.					
Alabama Great Southern .....	309	\$196,086	\$59,131	\$285,049	\$30,137	\$30,137	\$43,610	\$8,040	\$92,291	\$104,448	\$412*	\$184,601	\$11,778	\$88,258
Ann Arbor .....	301	126,472	32,187	167,085	19,174	16,808	29,745	3,124	3,124	38,712	1,502	103,313	8,000	53,905
Atlanta, Birmingham & Atlantic .....	642	164,966	29,013	204,824	29,445	29,445	34,617	6,980	83,170	81,526	360	166,608	12,500	30,216
Central Vermont .....	441	217,620	58,568	276,188	22,847	22,847	12,808	2,456	43,106	61,227	1,900*	87,276	4,100	69,387
Central & Western Carolina .....	339	128,370	19,893	148,263	22,947	22,947	112,299	15,224	295,270	361,227	1,900*	514,825	26,500	332,738
Chicago & Eastern Illinois .....	966	695,418	128,553	823,971	58,402	58,402	90,449	11,777	183,742	126,972	485	323,068	11,083	40,166
Chicago & Erie .....	209	284,934	62,016	346,950	26,512	26,512	26,512	13,308	153,742	88,251	253*	317,053	6,261	37,766
Chicago, Indianapolis & Louisville .....	619	365,388	102,128	467,516	51,065	51,065	44,159	16,168	100,751	132,696	994	167,053	25,795	104,972
Chicago, Rock Island & Gulf .....	492	461,880	113,265	575,145	28,721	28,721	22,947	21,398	273,504	132,696	712	317,793	20,000	121,449
Cincinnati, Hamilton & Dayton .....	337	510,488	109,649	620,137	43,377	43,377	22,497	16,547	213,560	252,638	994	510,197	20,000	233,632
Cincinnati, New Orleans & Texas Pac .....	438	140,624	62,315	202,939	21,738	21,738	78,425	2,590	57,676	68,506	1,737*	110,190	16,000	46,232
Detroit, Toledo & Erie .....	593	207,301	46,985	254,286	15,173	15,173	17,138	4,431	56,471	68,506	220*	153,169	10,023	58,263
Detroit, Toledo & Western .....	310	208,153	189,843	397,996	26,309	26,309	38,609	7,320	142,098	295,298	911	669,731	28,179	283,598
Evansville & Terre Haute .....	584	362,747	100,215	462,962	47,372	47,372	121,704	8,747	175,792	147,157	751*	317,793	21,138	129,889
Florida East Coast .....	1,338	592,609	189,839	782,448	121,702	121,702	43,258	7,320	142,098	295,298	5,621*	299,988	19,632	27,434
Galveston, Harrisburg & San Antonio .....	591	336,718	103,093	439,811	43,258	43,258	43,258	16,232	169,678	147,157	751*	317,793	21,138	129,889
Grand Rapids & Indiana .....	347	297,218	100,215	397,433	26,309	26,309	30,445	8,020	130,466	171,712	.....	240,099	13,962	16,307
Hocking Valley .....	1,159	458,587	130,149	588,736	43,258	43,258	57,536	17,136	48,727	52,671	.....	240,099	13,962	16,307
International & Great Northern .....	558	253,854	10,866	264,720	29,753	29,753	22,477	8,020	34,964	87,866	.....	347,964	7,338	65,169
Iowa Central .....	343	268,090	79,446	347,536	22,477	22,477	17,378	5,343	93,852	49,583	421*	174,013	15,118	200,640
Louisiana Ry. & Nav. Co. .....	1,027	627,711	92,441	720,152	86,141	86,141	86,141	19,855	294,099	256,967	3,397*	579,174	8,955	37,442
Minneapolis & St. Louis .....	1,098	179,631	48,473	228,104	37,146	37,146	38,590	5,343	93,852	49,583	421*	174,013	15,118	200,640
Mobile & Ohio .....	351	171,820	70,515	242,335	35,663	35,663	38,807	7,575	86,016	216,179	247*	321,298	23,303	202,462
Northwestern Pacific .....	468	435,210	96,801	532,011	61,999	61,999	100,960	10,150	268,586	229,078	3,313*	270,055	27,295	409,242
Peoria & Eastern .....	773	186,829	70,405	257,234	48,727	48,727	45,377	4,489	121,721	15,241	6,409*	249,312	21,600	179,706
St. Louis Southern .....	697	382,129	27,942	410,071	55,446	55,446	91,576	9,495	207,802	268,532	1,511	409,312	11,500	102,859
St. Louis, Arkansas & Texas .....	727	332,126	72,751	404,877	63,908	63,908	94,310	11,127	178,539	225,963	7,421*	388,524	11,500	50,670
San Antonio, Los Angeles & Salt Lake .....	1,098	423,126	72,751	495,877	84,174	84,174	51,951	5,500	101,307	62,745	1,511	253,963	11,500	30,568
San Pedro, Los Angeles & Salt Lake .....	5,598	216,142	40,317	256,459	25,233	25,233	54,275	6,096	102,916	114,359	.....	174,542	11,500	102,859
Southern Pacific Co.—Pacific System .....	450	210,147	31,185	241,332	31,917	31,917	31,917	6,096	102,916	114,359	.....	174,542	11,500	30,568
Texas & New Orleans .....	441	239,574	37,079	276,653	44,665	44,665	29,174	117,054	166,998	111,375	6,971	335,290	21,466	96,880
Toledo & Ohio Central .....	451	384,235	37,079	421,314	44,665	44,665	29,174	117,054	166,998	111,375	6,971	335,290	21,466	96,880
Toledo, St. Louis & Western .....	442	384,235	37,079	421,314	44,665	44,665	29,174	117,054	166,998	111,375	6,971	335,290	21,466	96,880
Wheeling & Lake Erie .....	442	384,235	37,079	421,314	44,665	44,665	29,174	117,054	166,998	111,375	6,971	335,290	21,466	96,880
Alabama Great Southern .....	309	\$1,698,754	\$726,603	\$2,425,357	\$340,869	\$340,869	\$68,015	\$893,118	\$803,565	\$5,882*	\$1,885,202	\$103,574	\$694,109	\$810,187
Ann Arbor .....	301	880,976	347,500	1,228,476	181,077	181,077	177,407	27,311	522,965	372,754	18,327	1,228,476	63,000	288,762
Atlanta, Birmingham & Atlantic .....	642	1,126,886	242,851	1,369,737	199,909	199,909	199,909	89,295	602,791	479,437	7,155	1,228,476	88,175	398,417
Central Vermont .....	441	1,671,886	292,245	1,964,131	351,330	351,330	351,330	135,552	222,228	299,451	14,269*	1,964,131	36,900	262,551
Chicago & Eastern Illinois .....	966	6,129,755	1,289,162	7,418,917	822,427	822,427	822,427	145,445	2,790,082	2,433,045	2,745	5,445,321	194,614	2,224,162
Chicago & Erie .....	269	2,357,532	581,496	2,939,028	299,795	299,795	299,795	112,230	1,329,471	1,138,293	1,422*	2,752,563	194,000	354,628
Chicago, Indianapolis & Louisville .....	616	2,565,414	593,897	3,159,311	580,801	580,801	580,801	132,662	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Chicago, Rock Island & Gulf .....	492	4,133,453	1,245,880	5,379,333	710,305	710,305	710,305	192,662	2,584,268	2,186,458	97	3,159,311	162,809	64,946
Cincinnati, Hamilton & Dayton .....	337	4,424,309	1,076,966	5,501,275	805,827	805,827	805,827	215,821	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Cincinnati, New Orleans & Texas Pac .....	438	987,451	274,830	1,262,281	212,979	212,979	212,979	77,619	330,005	225,368	2,770*	1,030,432	170,400	234,503
Detroit, Toledo & Erie .....	593	1,192,909	446,407	1,639,316	305,827	305,827	305,827	113,018	509,707	592,589	14,496*	1,639,316	182,403	499,425
Duluth, South Shore & Atlantic .....	310	1,006,496	287,496	1,293,992	246,343	246,343	246,343	89,295	330,207	225,368	1,496*	1,030,432	170,400	234,503
Evansville & Terre Haute .....	584	1,029,905	287,496	1,317,401	246,343	246,343	246,343	89,295	330,207	225,368	1,496*	1,030,432	170,400	234,503
Florida East Coast .....	1,338	5,671,209	1,734,047	7,405,256	390,792	390,792	390,792	145,445	2,790,082	2,433,045	2,745	5,445,321	194,614	2,224,162
Galveston, Harrisburg & San Antonio .....	591	2,086,089	539,160	2,625,249	462,184	462,184	462,184	132,662	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Grand Rapids & Indiana .....	347	3,836,154	1,074,129	4,910,283	710,305	710,305	710,305	192,662	2,584,268	2,186,458	97	3,159,311	162,809	64,946
Hocking Valley .....	1,159	4,568,128	1,245,880	5,814,008	805,827	805,827	805,827	215,821	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Houston & Texas Central .....	558	1,798,474	539,160	2,337,634	462,184	462,184	462,184	132,662	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
International & Great Northern .....	558	673,821	130,690	804,511	126,133	126,133	126,133	42,480	222,415	183,886	25,124*	366,401	184,800	990,268
Iowa Central .....	343	2,164,263	593,897	2,758,160	462,184	462,184	462,184	132,662	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Louisiana Ry. & Nav. Co. .....	1,027	5,418,945	1,350,000	6,768,945	805,827	805,827	805,827	215,821	1,789,045	1,865,155	11,371*	3,159,311	297,356	958,799
Minneapolis &														



**Refusal to Meet Competition.**

*La Salle Paper Company v. Michigan Central. Opinion by Commissioner Cockrell.*

Defendants' rate on paper stock from Chicago, Ill., to South Bend, Ind., not found unreasonable as compared with their rate on manufactured paper between the same points. The commission cannot order a reduction on paper stock in order to meet market competition, as railways are authorized to meet or not to meet competition, as to them seems to their interest.

**A Specified Route.**

*O. W. Council v. St. Louis & San Francisco et al. Opinion by Commissioner Clark.*

Complainant specifically directed that shipment of live stock be forwarded via a certain route in order that he might have the advantage of trying a market so reached. Shipment moved in accordance with his directions. He now claims reparation on the ground that a lower rate applied via another and more direct route than the one which he selected, but via which he could not have reached the market which he desired to try. Complaint dismissed.

**Free Transportation to Express Companies.**

*In the matter of contracts of express companies for free transportation of their men and material over railways. Opinion by Commissioner Prouty.*

A railway company may lawfully transport the men and supplies of an express company without reference to any tariff provision when employed or used in the business of the express company on the line of the railway itself, and in the same manner an express company may lawfully transport the packages of a railway company between points on that line of railway without reference to its tariff rates.

A railway company may not lawfully transport men and supplies of an express company when employed or used in the business of that company at points not on the line of railway, and an express company may not lawfully transport for a railway packages between points on its route but not on that particular line of railway.

**Through Routes Within a City.**

*Enterprise Fuel Co. v. the Pennsylvania et al. Opinion by Commissioner Lane.*

A city which embraces a wide area within its limits may, because of physical or business conditions, comprise one or more shipping communities to and from which through routes should be established, but a shipper is not entitled to a through route merely because he may not be as conveniently served by one railway as by another.

On complaint asking for establishment of a through route and joint rate via defendants' lines from Alden, Pa., to the Hillen and Walbrook stations of the Western Maryland in Baltimore, Md., it is held that (1) the through route at present existing to the terminals of the Pennsylvania in Baltimore is a satisfactory through route to Baltimore proper, in which the Hillen station of the Western Maryland is located; and that (2) Walbrook, although lying within the limits of Baltimore, is a distinct transportation point to which no satisfactory through route exists. Defendants ordered to establish a through route and joint rate to that point.

**Substitution of Tonnage.**

*C. H. Rodehaver v. Missouri, Kansas & Texas. Opinion by Commissioner Cockrell.*

The Missouri Commission Co. received 82,000 lbs. of hay shipped over defendant's line from a station in Kansas to St. Louis, Mo.; paid 19 cents per 100 lbs., and sold the hay to its customer; the Bartlett Commission Co. received 82,000 lbs. of hay shipped from points in Illinois, Iowa and Missouri over lines other than defendant's at St. Louis, Mo., and reconsigned the same to points east of the Mississippi river and south of the Ohio river. The complainant obtained the expense bills of the Missouri Commission Co. and the duplicate bills of lading of the Bartlett company, pre-

sented them to the defendant and demanded refund to an amount to reduce the rate to 13½ cents by reason of defendant's tariff, which "applies on hay, c. L., from stations in Missouri, Kansas and Indian territory on the M., K. & T. to St. Louis for reconsignment to points south of the Ohio river and east of the Mississippi river." Held that the complainant was not entitled to any refund or reparation in such a case, and that such substitution of tonnage could not be sanctioned.

**Discrimination Against Cincinnati Territory.**

*Indiana Steel & Wire Co. v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Cockrell.*

For a number of years prior to May 25, 1907, the defendants had maintained identical joint rates on steel and wire products from what was known as Chicago-Cincinnati territory when destined to Arkansas common points. Beginning on that date the carriers divided the territory along the Illinois-Indiana state line, and by tariffs in which they all participated or concurred established rates applying to Chicago territory and other rates applying to Cincinnati territory, particularly to Muncie, Ind., and Kokomo, which rates were higher from the last-mentioned points to Arkansas common points than from points of origin within Chicago territory. Manufacturers and shippers located at Muncie and Kokomo were therefore discriminated against in favor of the manufacturers and shippers in Chicago territory. The discriminations thus wrought between the two territories excluded the manufacturers at Muncie and Kokomo from competition in Arkansas common points with the manufacturers and shippers located in Chicago territory. The different rates, rules and regulations made to apply to Chicago territory and to Cincinnati territory beginning in May, 1907, are found to be undue and unjust and are therefore condemned.

**Discrimination Against Kansas City.**

*Kansas City Transportation Bureau of the Commercial Club v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Clark.*

Proportional rates on grain coming from beyond the Missouri river are the same to Mississippi river crossings from Omaha, Neb., and from Kansas City via all lines. Proportional rates on grain from Omaha to Cairo, Mo., and other Ohio river crossings, to Memphis, Tenn., to Carolina territory, and to New Orleans, La., Galveston, Tex., and other Gulf ports, for export, are 1 cent per 100 lbs. higher than from Kansas City. Complainant, representing grain dealers at Kansas City, alleges that this adjustment is unjustly discriminatory against Kansas City in that it does not give full recognition to the shorter distance from Kansas City to St. Louis and points southeast thereof.

In a case of this kind, there must be an examination and consideration of the entire rate from point of production to ultimate destination. It is not sufficient to consider the rates to an intermediate market, nor alone the rates from such market, if the question of discrimination between such markets is to be determined. Adoption of distance alone as a measure of the rates from points of origin to the primary market would necessarily result in a clear division of the territory between the markets and would be destructive of competition in most of that territory. It would destroy the long-established adjustment which places Missouri river crossings on a parity in both inbound and outbound rates on traffic generally. Giving to Kansas City all the advantage that could come to it from a mileage adjustment would give it a monopoly of territory in which Omaha now freely competes with Kansas City, and the application of the same rule to Omaha would give it exclusive purchasing power in territory in which Kansas City now competes with Omaha on equal terms. Complaint is dismissed.

**STATE COMMISSIONS.**

The Missouri Railroad Commission has suspended until June 10 its schedule fixing coal rates in Missouri. This schedule was first announced to go into effect on May 1 and was then suspended until May 15.

The Mississippi State Railroad Commission has decided unanimously to dismiss the petition for an order reducing passenger fares throughout the state. The result of the action is to leave the present passenger rate of 3 cents a mile undisturbed. Hundreds of business men aided the roads in their opposition to the proposed reduction.

#### Headlights in Indiana.

The Railroad Commission of Indiana has called a conference for May 27 to consider what shall be done under the recent law giving the commission power to investigate and determine as to the efficiency of headlights in use on locomotives, and to prescribe efficient and practicable headlights.

#### New Hampshire Express Rates Prescribed by Railway Commission.

*State Board of Trade v. the American Express Co. et al.*

The Canadian Express Company operates a short line on the Grand Trunk across the narrow northern portion of the state, and in the more populous southern portion there are several small express companies, but except these the American has a monopoly. Formerly the minimum charge was 15 cents a package, but last year this was advanced to 25 cents. Chairman Henry M. Putney, of the railway commissioners, being a stockholder in the express company, did not sit upon the case, and his place was filled, according to law, by Judge Oscar L. Young, of the Superior Court, the highest trial court in the state. The decision, issued May 13, says "the board is of the opinion that the charges \* \* \* are excessive and unreasonable, and that the public good requires the same should be changed." The order contains a complete distance tariff, ordered to go into effect June 1. Following are typical rates:

One-Line Scale (Per 100 lbs.)		Two-Line Scale (Per 100 lbs.)		Three-Line Scale (Per 100 lbs.)	
Miles.	Rate.	Miles.	Rate.	Miles.	Rate.
40 and under.	\$0.40	25 and under.	\$0.40	1 to 20	...\$0.40
40 to 70	... .50	25 to 50	... .50	20 " 40	... .50
70 " 90	... .60	50 " 75	... .60	40 " 60	... .60
90 " 120	... .75	75 " 100	... .75	60 " 75	... .75
120 " 250	... 1.50			200 " 250	... 1.50

Shipments weighing less than 100 lbs., and not exceeding \$50 in value:

		Where rate per 100 lbs. is—					
		40c.	50c.	60c.	75c.	90c.	\$1.00
Packages not over	1 lb. ...	\$0.15	\$0.15	\$0.15	\$0.20	\$0.25	\$0.25
Over 1 lb., not over	2 lbs. ...	.15	.15	.15	.20	.25	.25
" 2 lbs., " "	3 " ...	.15	.15	.15	.20	.25	.25
" 3 " " "	4 " ...	.15	.15	.15	.20	.25	.25
" 4 " " "	5 " ...	.15	.15	.15	.20	.25	.30
" 5 " " "	7 " ...	.15	.20	.20	.25	.30	.30
" 7 " " "	10 " ...	.15	.20	.20	.25	.30	.35
" 10 " " "	15 " ...	.20	.25	.30	.30	.35	.35
" 15 " " "	20 " ...	.25	.25	.30	.35	.35	.40
" 20 " " "	25 " ...	.25	.30	.30	.35	.40	.45
" 25 " " "	30 " ...	.30	.30	.35	.40	.45	.50
" 30 " " "	40 " ...	.40	.50	.55	.75	.80	.90

These figures are somewhat in excess of the old rates that prevailed before the raise in 1908, but are nearer the old rates than the new ones established by the express company. They differ only slightly from the rates prevailing along the Canadian Express Company's route. This is believed to be the first general fixing of rates for a whole state ever made by a railway commission in New England.

#### Indiana Full Crew Law.

In compliance with a call issued May 5 by the Indiana Commission about 60 superintendents and attorneys representing 39 railways met at the State House May 11. Several cases now pending in the courts are based on the fact that porters and brakemen have been assigned to the duty of flagmen when they have not had the required experience of one year in the train service. The Pennsylvania gave notice that it would carry the question as to the constitutionality of the law to the Supreme Court of the United States. It was the unanimous sentiment that the requirements of the law were unreasonable but so long as it was the law they purposed to comply with it where possible; but in many instances unforeseen conditions make it impossible to send a train out with a full crew. The limitation of a freight train to 50 cars was criticized. A freight train of 50 cars and a full crew

of five men would not dare add a car of stock to the train without securing the sixth man; and this was impossible at small stations. To go by and leave the car of stock on the siding subjected the company to damages. The conference was harmonious and the commission assured the roads that it would not advise or assist in the prosecution of cases when the companies had done the best they could under the circumstances to comply with the law.

#### COURT NEWS.

Hearings in the government investigation of the anthracite coal roads were continued at Philadelphia this week. W. J. Richards, First Vice-President of the Philadelphia & Reading Coal & Iron Co., gave detailed testimony concerning the area and ownership of coal fields in Pennsylvania, and described the process of mining.

The Supreme Court of the United States on May 17 decided against the railway in the case of the Texas & Pacific and others v. Easton and Knox and others involving the right to collect damages from a carrier in case of its failure to ship live stock from one point to another over the most direct route. The lower court awarded the shippers \$3,600, and that decision was affirmed by the Supreme Court of Texas and the Supreme Court of the United States.

The Supreme Court of the United States declines to grant writs of certiorari for the review of the judgments of the Federal Court of Appeals dissolving the injunctions against the Alabama Railroad Commission and thus leaves undisturbed the decision, against the railways, handed down by the lower court. The suit of the roads was to enjoin the enforcement of the rates on passengers and commodities enacted by the commission and the legislature. The ground taken by the Court of Appeals was that under the Supreme Court's decisions in the cases of the Knoxville Water Company and the Consolidated Gas Company of New York injunctions would not lie against the enforcement of rates enacted by the legislature unless it had been shown by an actual test of the rates that they were confiscatory.

#### Santa Fe Compelled to Lend Its Cars.

The Fourth Court of Civil Appeals of Texas has decided that a railway may not refuse to let its cars go to another road with through carload shipments, and may not require a transfer of a shipment from one car to another when the shipment passes to a connecting line. The decision was rendered in a case that was brought at the instance of the State Railroad Commission against the Gulf, Colorado & Santa Fe. During the car shortage in 1907 the G. C. & S. F. notified the Lumpkin Mills Company, at Meriden, that it would not transfer a car, loaded with products of this concern, from its tracks to those of the Houston & Texas Central, at Navasota, for transportation to Millican, 10 miles further on, the Santa Fe having declared an embargo in order to keep all of its available cars on its own rails for the use of shippers at its own stations. The shipper nevertheless consigned the shipment through, and the Santa Fe stopped the car at Navasota, the junction point, about 200 miles from Meriden, offering, however, to transfer the goods to the other company's car at its own expense. The shipper refused this offer and appealed to the railroad commission, which in 1896 had issued an order requiring railways to transfer cars containing carload shipments to the tracks of connecting lines, and the commission imposed a fine of \$5,000. The district court, to which the case was appealed, sustained the commission's ruling, but reduced the fine to \$500. The Santa Fe then appealed to the Court of Appeals, arguing that to force it to send its cars off its own rails was to deprive it of its property without due process of law. The Court of Civil Appeals said that the position of the Santa Fe was opposed to established transportation practice. If the Houston & Texas Central had kept the car longer than it should the Santa Fe could have recovered damages against it under the laws of the state; therefore, its plea that it was deprived of its property without due process was not valid. The court held that to compel such transfer en route as the Santa Fe insisted on would work injustice to shippers and injury to the public.



## Railroad Officers.

### ELECTIONS AND APPOINTMENTS.

#### Executive, Financial and Legal Officers.

J. M. Schoonmaker, Vice-President of the Monongahela, has been elected President, succeeding Joseph Wood, resigned.

H. E. Byram, Superintendent of the Nebraska district of the Chicago, Burlington & Quincy, has been appointed Assistant to the Second Vice-President, with office at Chicago. He will give special attention to matters of discipline and perform such other duties as may be assigned to him.

The following have been elected officers of the Alaska Central, which is in the hands of a receiver: R. D. Miller, President; G. R. Sanborn, Vice-President; James A. Haight, Secretary and Treasurer, succeeding, respectively, A. C. Frost, President; H. C. Osborn, Vice-President; G. L. Francis, Treasurer.

Alfred H. Bright, General Counsel of the Minneapolis, St. Paul & Sault Ste. Marie, as formerly announced in these columns, has been appointed also Vice-President and General Counsel of the Wisconsin Central, with office at Minneapolis, Minn. Mr. Bright was born on October 29, 1850, at Adams Center, N. Y., and was educated in the common schools and at the University of Wisconsin, from which he graduated in 1874. On January 1, 1888, he became General Solicitor of the Milwaukee & Northern. From Jan. 1, 1891, to March 1, 1908, he was General Solicitor of the Minneapolis, St. Paul & Sault Ste. Marie, and since March 1, 1908, he has been General Counsel, which office he continues to hold.

#### Operating Officers.

James B. Sparks, recently appointed Superintendent of the Southern Pacific Lines in Mexico at Guadalajara, Jal., was born October 23, 1872, at Murfreesboro, Tenn. He graduated



J. B. Sparks.

from the Union University at Murfreesboro in June, 1890, and began railway work almost immediately on the Nashville, Chattanooga & St. Louis as agent's clerk at Murfreesboro. In November, 1890, he was transferred to Nashville and later worked in the local freight office. Two years later he became a clerk in the claims office of the Mexican International under J. E. Dennison, now General Auditor of the National Railways of Mexico. In 1893 he was made chief rate clerk in the traffic department, and the next year was made chief clerk and car accountant in the transportation department. From 1900 to 1902 he was engaged in business not connected with railways. In October, 1902, he became chief clerk in the store department of the Los Angeles & Pacific Electric and for a while was Acting Storekeeper. In 1903 he became a Chief Despatcher's clerk and clerk to the District Freight and Passenger Agent of the Southern Pacific at Tucson, Ariz. In June the next year he was appointed Auditor of the Consolidated Telephone, Telegraph & Electric Co., and in November, 1906, returned to railway work as chief clerk and cashier to the Division Engineer of the Southern Pacific at Guadalajara. In 1907 he was appointed the General Agent of the construction and engineering departments, with office at Guadalajara, taking care of the adjustment of right of way

matters between the company and the government. He held this position until his recent appointment.

T. M. Flynn has been appointed the Trainmaster of the Third and Fourth districts of the Northern Pacific, with office at Forsythe, Mont., succeeding G. T. Ross, promoted.

J. P. Rogers, Superintendent of Construction of the Hanford Irrigation & Power Company, has been appointed the Superintendent of the Spokane, Portland & Seattle at Vancouver, Wash.

W. B. Throop, General Superintendent of the Iowa district of the Chicago, Burlington & Quincy, has been appointed the General Superintendent of the Nebraska district, with office at Lincoln, Neb., succeeding H. E. Byram, promoted to Assistant to the Second Vice-President. L. B. Allen, General Superintendent of the Wyoming district, succeeds Mr. Throop, with office at Burlington, Iowa. E. P. Bracken, Superintendent of the Galesburg division, succeeds Mr. Allen, with office at Alliance, Neb. S. H. Shults, Superintendent of the Brookfield division, succeeds Mr. Bracken, with office at Galesburg, Ill. W. C. Welch succeeds Mr. Shults, with office at Brookfield, Mo.

#### Traffic Officers.

A. L. Ruff has been appointed the General Agent of the Spokane, Portland & Seattle at Seattle, Wash.

E. G. Vestal has been appointed a Traveling Passenger Agent of the San Pedro, Los Angeles & Salt Lake, with office at Los Angeles, Cal.

W. J. Sheridan, Soliciting Freight Agent of the Lehigh Valley at Sayre, Pa., has been transferred as Soliciting Freight Agent to Geneva, N. Y., succeeding A. T. Stark, transferred. W. H. Spencer succeeds Mr. Sheridan.

G. H. Kelland, Secretary of the Official Classification Committee, succeeds F. S. Holbrook as Representative of the Trunk Line Association on the Uniform Classification Committee. Oscar Levenberg succeeds Mr. Kelland.

F. J. Wheeler, General Agent of the freight department of the San Pedro, Los Angeles & Salt Lake, has been appointed General Agent of both the freight and passenger departments, with jurisdiction extending from San Diego, Cal., to San Francisco.

H. G. Elliott, whose appointment as Assistant General Passenger Agent of the Grand Trunk, succeeding Mr. Bell, promoted, has been previously announced, was born in Chambly, Que., in 1860. He began railway work in 1882 as city ticket agent of the Central Vermont at the Montreal office of the company. In May, 1897, he became ticket agent of the Grand Trunk at Montreal, and in July was made excursion clerk in the General Passenger and Ticket department. In August, 1899, he was appointed chief clerk in the General Passenger and Ticket department, and in May of the next year was made Assistant General Passenger and Ticket Agent, holding this position until May 1.



H. G. Elliott.

E. R. Reynolds has been appointed the General Baggage Agent of the Chicago Great Western, with office at Chicago, succeeding G. T. Spilman, and D. Menzie has been appointed Superintendent of Dining Cars, with office at Chicago, succeeding Mr. Spilman.

U. L. Truitt, whose resignation as General Eastern Pas-

senger Agent of the Chesapeake & Ohio has been announced in these columns, has become associated with the New York Stock Exchange firm of W. L. Lyons & Co., and will act as manager of the firm's branch office at 309 Broadway, New York.

G. T. Bell, recently appointed Assistant Passenger Traffic Manager of the Grand Trunk and the Grand Trunk Pacific, was born in 1861 and began railway work on the Grand Trunk in 1878. In November, 1880, he was made Secretary to the General Passenger Agent, and in 1882 was appointed chief clerk to the Assistant General Passenger Agent at Toronto, three years later being transferred as chief clerk to the General Passenger office at Montreal. By 1892 he had become Assistant General Passenger Agent, and in 1899 was made First Assistant General Passenger Agent. A year later he was appointed General Passenger Agent, holding this position until his appointment as Assistant Passenger Traffic Manager.



G. T. Bell.

C. E. Smith has been appointed a General Agent of the Erie Despatch, with office at Los Angeles, Cal. His territory includes Arizona and the southern section of California. C. E. Baker has been appointed a General Agent, with office at Portland, Ore. His territory includes Oregon and that part of Washington south of Snake river. H. J. Steeple has been appointed a General Agent, with office at Seattle, Wash. His territory includes Alaska, British Columbia and that part of Washington north of Snake river.

#### Engineering and Rolling Stock Officers.

D. Fairchild has been appointed the Roadmaster of the Second district of the Yellowstone division of the Northern Pacific, succeeding J. H. Daly, resigned.

Robert P. Madill, Division Engineer of the Erie, with office at Rochester, N. Y., has been transferred as Division Engineer to Buffalo, N. Y., succeeding W. C. Hebard, resigned to engage in other business.

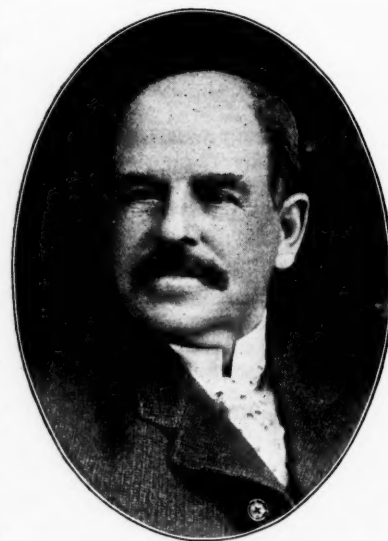
F. L. Nicholson, Engineer Maintenance of Way of the Norfolk & Southern, has been appointed Chief Engineer in charge of Construction and Maintenance of Way and Structures, with office at Norfolk, Va., and his former position has been abolished.

M. L. Newton, Chief Engineer of the Waterloo, Cedar Falls & Northern, has been appointed Consulting Engineer, with office at Waterloo, Iowa, and will perform such duties as may be assigned to him. T. E. Rust, Assistant Engineer of the Chicago Great Western, succeeds Mr. Newton, with office at Waterloo, and all employees heretofore reporting to Mr. Newton will hereafter report to Mr. Rust.

C. B. Keiser, recently appointed Master Mechanic of the Pennsylvania Tunnel & Terminal, was born in 1874 at West Milton, Pa. He is a graduate of the Pennsylvania State College of the class of 1898, having taken the electrical engineering course. He began railway work on the Pennsylvania as machinist at the Wellington shop in 1898, and two years later became draftsman in the Motive Power department at Altoona. In 1902 he became an inspector of motive power in the office of the Superintendent of Motive Power of the Philadelphia, Baltimore & Washington, and in 1905 was appointed Assistant Master Mechanic in the Wellington shop of the P., B. & W. A year later he was made Assistant Electrical Engineer in charge of electric operation of the West

Jersey & Seashore, which position he held until his recent appointment.

J. J. Ellis, for a number of years in the Motive Power and Mechanical department of the Chicago, St. Paul, Minneapolis & Omaha, and until the early part of this year Superintendent of Motive Power, has retired from railway service. He served an apprenticeship with Knowles & Houghton, of Leeds, Yorkshire, England. After seven years with this firm he became foreman of the shops of H. Cook & Co., of Leeds. After some years service with them he began railway work on the London & North Western, remaining with that road for eight years. He was then appointed foreman of the Manchester shops of Sir William Fairburn, and was later sent to Scotland to erect machinery and buildings for the manufacture of patent fuel, and on the completion of this work was made Manager of the plant that he had built. He later came to America and was made foreman of the Hudson shops of the Chicago, St. Paul, Minneapolis & Omaha, and in 1892 was made Master Mechanic, the shops having in the meantime been moved to St. Paul. He was later appointed Superintendent of Motive Power and Machinery, holding this position until his retirement.



J. J. Ellis.

#### OBITUARY.

Fred C. Mater, Yardmaster of the Chicago Great Western at Mason City, Iowa, was accidentally killed at Mason City on May 4.

A. H. McLeod, formerly Freight Traffic Manager of the Cincinnati, Hamilton & Dayton and the Chicago, Cincinnati & Louisville, died at his home in Wyoming on May 10. Mr. McLeod was: from 1861 to 1871 a clerk in the General Freight department of the Baltimore & Ohio; from 1871 to 1873, Assistant General Freight Agent of the Pittsburgh, Washington & Baltimore; from 1873 to 1874, confidential clerk in the General Freight department of the Erie; from 1874 to 1875, General Manager of the Diamond Fast Freight Line; from 1875 to 1896, General Freight Agent of the Cincinnati, Hamilton & Dayton; from 1896 to 1905, Freight Traffic Manager of the same road; from 1904 to 1905 also Freight Traffic Manager of the Chicago, Cincinnati & Louisville, and from 1905 until the time he retired from railway service, Freight Traffic Manager of the Cincinnati, Hamilton & Dayton at Cincinnati.

H. H. Rogers, Vice-President of the Standard Oil Co. and President of the Virginian Railway, died at his home, 3 East Seventy-eighth street, New York, early Wednesday morning, May 19. He was born in 1840 at Mattapoisett, Mass. He was a director in more than 20 corporations, many of them of first importance, and was up to about two years ago the dominating personality in the Standard Oil Co., having taken this position after John D. Rockefeller withdrew from active participation in the affairs of the company some eight years ago. The Virginian Railway, recently opened for traffic, was the last great undertaking of Mr. Rogers, and was one of the most remarkable railway projects ever carried out. The line is 442 miles long, extending from Kanawha river coal fields in West Virginia to tidewater. It embodies the principles of the best standard low-grade railway practice. It cost in the neighborhood of \$40,000,000. The larger part of this money was supplied by Mr. Rogers personally, and while there are \$17,000,000 tidewater notes and \$3,750,000 equipment trust certificates outstanding, they bear the personal guarantee of Mr. Rogers.



## Railroad Construction.

### New Incorporations, Surveys, Etc.

**ARKANSAS ROADS.**—A business men's league has been organized in Stuttgart, Ark., which will prepare a plan for a new 20-mile railway from Stuttgart to a connection with the Rock Island system. G. W. Fagan, Pres.; J. I. Ingram, Secy.

**ALGOMA CENTRAL & HUDSON BAY.**—The Manitoulin & North Shore will, during the present year, build between mile 13 and Little Current, Ont., about 70 miles. This work includes a bridge over the Vermillion river; a through girder bridge, 183 ft. long, over the Spanish river, and one of two 50-ft. spans, on concrete piers in abutments, over the Spanish River Paper & Pulp Company's power canal. The two latter bridges are completed, also part of the grading. There will be a swing bridge at Little Current, details of which are now under consideration. Surveys have been made between Sudbury, Ont., and Little Current. It is probable that this line will be built on a one-per-cent. grade, with a curvature of from 8 to 10 deg. Bids will be asked for the construction of the first section, 10 miles, about the end of May. (April 23, p. 918.)

**ATCHISON, TOPEKA & SANTA FE.**—An officer writes that contracts have been let for the extension of the Pecos & Northern Texas from Plainview, Tex., to Lubbock, about 47 miles. Moore & Harris, contractors. G. W. Harris, Amarillo, Texas, Ch. Engr. of Construction. (March 19, p. 61.)

**CALIFORNIA NORTHEASTERN.**—See Southern Pacific.

**CANADIAN & NORTHERN.**—This company will spend about \$1,000,000 on construction during the remainder of the present year. The work is to include relaying, with heavier rails, 200 miles of the main line between Winnipeg, Man., and Port Arthur, Ont.

No work will be done this summer on the Hudson Bay branch north of Le Pas, but the roadbed south of that point will be rebalasted.

Bids are being received for construction of 40 miles on the Shelbourne line in the vicinity of Prince Albert, Sask.

**CANADIAN PACIFIC.**—The plans for the extension of the Esquimalt & Nanaimo branch from French Creek, B. C., to Alberni, have been accepted by the Railroad Commission, and Construction will be started at once. (March 19, p. 660.)

**CHICAGO, WEATHERFORD & BRAZOS VALLEY.**—According to press reports, Colonel R. E. Bell and J. W. Hicks, of Weatherford, are interested in a project to build from Gainesville, Tex., southwest to Kerrville, about 300 miles.

**CUBA RAILROAD.**—The plans submitted by this company for building a line from Marti, in the province of Camaguey, on the main line, southeast via Bayamo, Santa Rita, Jiguani, Baire and Palma Soriano, and also a branch from Bayamo via Veguita and Yara to Manzanillo, were approved by President Gomez on March 25. The new extension will be about 175 miles long, to be completed about May, 1911. The company will receive a subsidy of \$9,600 per mile.

**CUBAN RAILWAYS.**—Consul R. E. Holaday at Santiago, Cuba, writes that railways are constantly being planned in Cuba and it is probable that in the next two years several new roads and important extensions of old lines will be built.

**DULUTH, WINNIPEG & PACIFIC.**—This company is said to have filed a mortgage to secure \$1,250,000 bonds, covering the proposed line from Virginia, Minn., south to Duluth. (April 2, p. 774.)

**FARMERS & STOCKGROWERS.**—An officer writes that this company was incorporated in Kansas with \$100,000 capital to build about 200 miles. The projected route is from a point in Pratt county west through Edwards, Kiowa, Ford, Gray, Haskell, Grant and Stanton counties to the Colorado state line. G. C. Brown, Pres., Plains, Kan.; J. N. Brown, J. H. Collingwood, J. R. Bolin and J. R. George are incorporators.

**GARDEN CITY, GULF & NORTHERN.**—An officer writes that construction work is now under way. The projected route is from Plains, Kan., on the Chicago, Rock Island & Pacific, north via Garden City and Scott to St. Francis in Cheyenne county, about 225 miles. The company was recently incor-

porated with \$5,000,000 capital and expects to have the section from Garden City north to Scott City, about 40 miles, in operation by December. B. M. McCue, Pres.; E. A. Tennis, V.-Pres.; J. W. Hope, Secy., and F. C. Avery, Treas., Garden City. (May 7, p. 1007.)

**GULF, COLORADO & SANTA FE.**—According to press reports, track-laying is now under way by the Texas & Gulf on the line from Center, Tex., northwest via Tenaha to Zuber, 21.3 miles. It is expected the line will be opened for traffic early in June. (March 19, p. 654.)

**INTERNATIONAL & GREAT NORTHERN.**—According to press reports, this company is filling in a large section adjoining its present yards, at the foot of Caroline and Austin streets, in Houston, Tex. When finished, the site will be used for storage and loading yards. A number of wharves may also be built along the channel. The plans include a large outbound freight warehouse on Commerce street. Heavy rails are now on the way to replace the light sections from Houston north to Spring, 23 miles, and about 200 miles additional will be relaid with heavy rails when this work is finished.

**KANSAS CITY SOUTHERN.**—An officer writes that grade reduction work on a moderate scale will be begun in the near future. (March 19, p. 655.)

**LAKE SHORE & MICHIGAN SOUTHERN.**—An officer writes that it is the intention to place 100-lb. rails on the line between Youngstown, Ohio, and Ashtabula, this year, and ultimately to ballast it with stone to bring it up to the main line standard. This line now has double track from Ashtabula to Carson, five miles, single track from Carson to Brookfield, 47 miles, and double track from Brookfield to Youngstown, 11 miles. It is also the intention to grade for a third, or a slow speed, track over the route from Brookfield to Youngstown, this year, and complete the line next year.

An officer writes that the Franklin & Clearfield will probably be completed to a connection with the Pennsylvania, near Brookville, Pa., by about July 5. (March 19, p. 655.)

**MISSOURI, KANSAS & TEXAS.**—According to press reports, recent orders have been given to rebuild the line between Denison, Tex., and Atoka, Okla. (Oct. 2, p. 1076.)

**MONTANA WESTERN.**—An officer of the Conrad Land & Water Co. writes that the proposed route is from Conrad, Mont., on the Great Northern, northwest to the new town of Valier, about 20 miles, traversing an extensive irrigation district. The project is being carried out by the Conrad Land & Water Co., of which W. S. Cargill is Pres.; A. M. Tortellotte, Vice-Pres.; W. W. Withee, Secy. and Treas., and J. B. Bond, Ch. Engr., Conrad.

**PECOS & NORTHERN TEXAS.**—See Atchison, Topeka & Santa Fe.

**SACRAMENTO SOUTHERN.**—See Southern Pacific.

**SAN DIEGO & ARIZONA.**—An officer writes that contracts were to be let about May 15 for the grading and masonry work on the first section of 15 miles from San Diego, Cal., south to Tia Juana in lower California. The line is projected from Tia Juana, east through Mexico, thence into California, continuing east to the Colorado river. E. J. Kallright, Ch. Engr., Union building, San Diego, Cal. (April 30, p. 961.)

**SOUTH DAKOTA INTERURBAN.**—Incorporated in South Dakota, with \$1,000,000 capital and headquarters at Centerville, to build about 160 miles from Sioux City, Iowa, northwest to Bijou Hills, S. Dak.

**SOUTHERN PACIFIC.**—Press reports say that Southern Pacific lines will be open for traffic about June 1 as follows:

California Northeastern.—Building from Weed, Cal., north to Klamath Falls, Ore., 89 miles.

Sacramento Southern.—Building from Sacramento, Cal., south to Antioch, 54 miles.

SPOKANE, PORTLAND & SEATTLE.—See item in another column regarding opening of this line.

TEXAS & GULF.—See Gulf, Colorado & Santa Fe.

**TOPPENISH, SIMCOE & WESTERN.**—Incorporated in Washington, with \$500,000 capital, to build from Toppenish, Wash., on the Northern Pacific, west to Fort Simcoe, about 30 miles. F. A. Williams, J. D. Cornett, W. S. Shearer, C. F. Meyer and Z. Y. Coleman, all of Toppenish, are interested.

## Railroad Financial News.

**ALABAMA GREAT SOUTHERN.**—An initial dividend of 2 per cent. on the \$7,830,000 ordinary stock outstanding has been declared, payable June 26. The Alabama Great Southern is controlled through the ownership of \$4,540,050 ordinary stock and \$1,725,000 preferred stock by the Southern Railway, and it in turn controls jointly with the Cincinnati, Hamilton & Dayton, the Cincinnati, New Orleans & Texas Pacific. The Southern Railway will receive as its share of the present dividend \$90,801.

**BOSTON & MAINE.**—Governor Draper, of Massachusetts, in speaking of the proposed bill which provides for a company to be formed under the auspices of the legislature of Massachusetts to take over the \$11,000,000 stock of the Boston & Maine, held by John L. Billard, says: "It is evident that I have consulted with various people in regard to this matter, and that if a company is created on lines indicated in this bill the transaction can be carried through." (April 23, page 919.)

**CANADIAN NORTHERN.**—See Duluth, Winnipeg & Pacific under Railroad Construction.

**CENTRAL TERMINAL CO. (CHICAGO).**—A committee consisting of I. M. Cobe, E. K. Boisot and Samuel Insull has prepared a plan for the consolidation of the elevated lines in Chicago. The committee suggests the organization of the Central Terminal Co., with at least \$4,000,000 stock, to take over the Union Consolidated Elevated (downtown loop), and to lease the South Side Elevated, the Northwestern, the Metropolitan West Side and the Chicago & Oak Park, the rentals under the lease to be paid on a sliding scale of dividends on the stock of the leased companies.

**CHICAGO & NORTH WESTERN.**—The \$769,000 7 per cent. Cedar Rapids & Missouri River bonds of 1884-June 1, 1909, will be paid at maturity at the office of the treasurer of the Chicago & North Western, 111 Broadway, New York.

**CHICAGO & OAK PARK.**—See Central Terminal Co.

**CHICAGO, MILWAUKEE & PUGET SOUND.**—A mortgage securing an authorized issue of \$100,000,000 4 per cent. bonds of 1909-1939 has been filed with the Secretary of State of South Dakota. The \$100,000,000 stock of the company is all owned by the Chicago, Milwaukee & St. Paul. (Jan. 15, 1909, page 140.)

See Union Pacific.

**DELAWARE, LACKAWANNA & WESTERN.**—There have been three plans suggested by which the company can legally comply with the commodities clause as interpreted by the Supreme Court of the United States, which forbids a railway company to transport coal or other commodities, with the exception of lumber, in which it has a legal interest. The first plan would provide for a holding company to take over the coal lands, the stock of the holding company to be distributed among the D., L. & W. stockholders; the second plan would provide that the coal lands be leased to an operating company; the third plan would provide for a selling company, whose stock should be owned by the Delaware, Lackawanna & Western.

**CHICAGO, MILWAUKEE & ST. PAUL.**—See Chicago, Milwaukee & Puget Sound.

**DULUTH, RAINY LAKE & WINNIPEG.**—See Duluth, Winnipeg & Pacific under Railroad Construction.

**FLORIDA EAST COAST.**—A mortgage has been filed securing \$12,000,000 4½ per cent. bonds and \$28,000,000 5 per cent. bonds. There are \$7,258,000 first mortgage 5 per cent. bonds and \$8,742,000 second mortgage 5 per cent. bonds outstanding it is understood, and \$16,000,000 new bonds are to be used to refund these two issues, while the remainder of the new bonds are reserved for future purposes.

**GRAND RIVER.**—See Michigan Central.

**GRAND TRUNK.**—See Grand Trunk Pacific.

**GRAND TRUNK PACIFIC.**—The Canadian House of Commons has passed a bill authorizing the government to advance \$10,000,

000 as a loan to the Grand Trunk Pacific to aid the company to complete the building of the prairie section. The loan is to bear interest at 4 per cent. and to be repaid in 10 years. It will be secured by an issue of \$10,000,000 4 per cent. bonds maturing in 1919. New bonds which are to be issued will be secured by a new mortgage covering the prairie section, subject to prior liens and guaranteed principal and interest by the Grand Trunk.

**HOUSTON BELT & TERMINAL.**—G. H. Walker & Co., St. Louis, Mo., have bought and resold \$2,246,000 Houston Belt & Terminal first mortgage sinking fund 5 per cent. bonds of 1907-1937. (April 9, page 821.)

**HUDSON & MANHATTAN.**—The board of directors has been increased from 9 to 11. Richard W. Meirs and United States Senator F. O. Briggs have been elected new directors. There is now one vacancy in the board.

**KANSAS CITY SOUTHERN.**—W. H. Williams, Third Vice-President of the Delaware & Hudson, and E. R. Bacon, Vice-President of the Baltimore & Ohio Southwestern, have been elected directors of the Kansas City Southern, succeeding H. Blumenthal and H. R. Duval.

**LOUISVILLE & NASHVILLE.**—Kissel, Kinnicutt & Co., N. W. Harris & Co., Moffat & White and the National City Bank, all of New York, are offering \$4,500,000 Paducah & Memphis division first mortgage 4 per cent. bonds of 1896-1946 of the Louisville & Nashville at 98. The bonds formed part of the collateral securing \$23,000,000 notes which were called for payment April 1, 1909.

**METROPOLITAN WEST SIDE.**—See Central Terminal Co.

**MICHIGAN CENTRAL.**—Stockholders of the Grand River, a subsidiary of the Michigan Central, the line of which runs from Rivers Junction, Mich., to Grand Rapids, 84 miles, have authorized a mortgage to be made jointly with the Michigan Central to secure \$4,500,000 4 per cent. bonds of September 1, 1909-1959. Of these bonds, \$1,500,000 are to be issued to retire a like amount of first mortgage 6 per cent. bonds due September 1, and \$1,500,000 are to be issued to furnish funds for double-tracking and other improvements.

**NEW YORK, NEW HAVEN & HARTFORD.**—See an item in regard to this company under General News.

**NORTHWESTERN (CHICAGO).**—See Central Terminal Co.

**PENNSYLVANIA.**—Kuhn, Loeb & Co., New York, have bought and resold \$8,100,000 4 per cent. general first mortgage equipment trust certificates, maturing in instalments from 1911 to 1917.

**ST. LOUIS, BROWNSVILLE & MEXICO.**—Official denial is made of reports that there is to be a change in the control of this road. It is stated that there is no deal on foot at the present time for a sale to the Chicago, Rock Island & Pacific interests or to any other interests.

**SOUTHERN RAILWAY.**—See Alabama Great Southern.

**SOUTH SIDE ELEVATED.**—See Central Terminal Co.

**THIRD AVENUE.**—The property of this company, which is in the hands of F. W. Whitridge, as receiver, is to be sold at public auction September 2 under foreclosure proceedings brought by the Central Trust Co., New York, as trustee for the \$37,560,000 first consolidated mortgage 4 per cent. bonds on which interest is in default. The sale will be subject to the prior lien of the \$5,000,000 first mortgage 5 per cent. bonds. Besides the physical property the company owns stock of other companies, included in which is \$2,000,000 stock of the Union Pacific. The Third Avenue operates 34 track miles of street railway in New York City and controls 235 miles, and has been in the hands of a receiver since September, 1907.

**UNION CONSOLIDATED ELEVATED.**—See Central Terminal Co.

**UNION PACIFIC.**—A deed conveying to the Union Pacific an undivided one-half interest in the line of the Chicago, Milwaukee & Puget Sound extending from Puyallup river bridge, just outside Tacoma, to Black River junction, 26 miles, has been filed.



## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

The Chicago, Burlington & Quincy will order a number of locomotives, probably 40.

The Aliquippa & Southern is said to be figuring on locomotives. This is not yet confirmed.

The Bessemer & Lake Erie is said to be about to order locomotives. This is not yet confirmed.

The Buffalo, Rochester & Pittsburgh has ordered from the American Locomotive Co. the 15 locomotives mentioned in the Railroad Age Gazette of April 2.

The Charlotte Harbor & Northern is in the market for 5 locomotives. L. M. Fouts, 2nd Vice-Pres. and Gen. Mgr., 317 Duval building, Jacksonville, Fla.

The Kansas City Belt has ordered 2 simple switch engines from the Baldwin Locomotive Works for delivery in 60 days.

#### General Dimensions.

Weight on drivers	121,000 lbs.
Weight, total	121,000 lbs.
Cylinders	19 in. x 24 in.
Diameter of drivers	51 "
Boiler, type	Straight top
Boiler, working steam pressure	180 lbs.
Heating surface, tubes	1,372 sq. ft.
" " firebox	123 "
" " total	1,495 "
Tubes, number	240
" outside diameter	2 in.
" length	11 ft.
Firebox, length	8 ft. 8 1/2 in.
Grate area	25 sq. ft.
Tank capacity	4,500 gals.
Coal capacity	9 tons
Tractive effort	28,158 lbs.

#### Special Equipment.

Axles	Steel
Bell-ringer	Golmar
Boiler lagging	B. L. W.
Brakes	Westinghouse E. T.
Couplers	Chimax
Driving boxes	Steel
Headlight	Star
Injector	Ohio
Piston and valve rod packing	United States
Safety valve	Crosby
Sanding devices	Leach
Sight-feed lubricators	Chicago
Tires	Standard
Wheel centers	Steel

The Chesapeake & Ohio, as reported in the Railroad Age Gazette of April 30, has ordered from the American Locomotive Co., for delivery on or before November 1, 35 simple consolidation locomotives.

#### General Dimensions.

Weight on drivers	173,000 lbs.
Total weight	195,000 lbs.
Cylinders	22 in. x 28 in.
Diameter of drivers	56 "
Type of boiler	Extended wagon top
Working steam pressure	200 lbs.
Heating surface, tubes	2,526 sq. ft.
" " firebox	157 "
" " total	2,709 "
Tubes, number	329
" outside diameter	2 in.
" length	14 ft. 9 "
Firebox, type	Wide
" length	90 in.
" width	75 "
Grate area	46.87 sq. ft.
Water capacity	7,000 gals.
Coal capacity	10 tons

#### Special Equipment.

Bell ringer	Western
Boiler lagging	Standard and Ehret
Brakes	Westinghouse
Brake-beams	Metal to C. & O. specifications
Brake-shoes	Drivers, National B. S. Co.
Brake-shoes	Tenders, Columbia B. S. Co.
Brick arch	Newton Fire Brick Co.
Couplers	Tower
Driving boxes	Cast steel with Elvin lubricators
Headlight	Dressel
Injector	Hancock Inspirator
Journal bearings	Brady Brass Co.
Piston and valve-rod packings	Jerome & Elliott
Safety valve	Consolidated
Sanding devices	Waters
Sight-feed lubricators	Nathan bulls-eye
Springs	Union Spring & Mfg. Co.
Staying	Brown, U. S. and Old Dominion I. & N. Co.
Steam gages	Star
Tires	Latrobe
Tubes	Detroit Seamless Steel Tube Co.
Valve gear	Walschaert
Wheel centers	Cast steel

### CAR BUILDING.

The Lehigh Valley is in the market for 15 coaches.

The Hastings Express Co. has ordered 4 cars from the Pullman Company.

The Baltimore & Ohio will have 500 box cars rebuilt by the Ryan Car Co.

The Pennsylvania Lines West have been figuring on 121 steel passenger cars.

The Western Maryland has ordered one parlor car from the Barney & Smith Car Co.

The Bessemer & Lake Erie is said to be about to order cars. This is not yet confirmed.

The Aliquippa & Southern is said to be figuring on cars. This is not yet confirmed.

The South Manchurian has ordered fifty 50-ton steel drop-bottom cars from the Ralston Steel Car Co.

The Maine Central has ordered fifty 50-ton gondolas and fifty 40-ton gondolas from the Standard Steel Car Co.

The Oregon Railroad & Navigation Co. has ordered two McKeen motor cars, each to seat about 70 passengers.

The Interborough Rapid Transit is in the market for 150 steel side door subway cars and 100 elevated railway cars.

The Baltimore & Ohio, which has been considering the purchase of equipment for some time, will soon buy freight and passenger cars.

The Chesapeake & Ohio has ordered 500 hopper cars from the Standard Steel Car Co. and 500 hopper cars from the Pressed Steel Car Co.

The Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern have ordered 226 car bodies from the Mount Vernon Car Co.

The Temiskaming & Northern Ontario is said to have ordered seven steel underframe passenger train cars from the Silliker Car Co. This is not yet confirmed.

The Great Northern, reported in the Railroad Age Gazette of April 16 as being in the market for 500 refrigerator cars, has placed this order with the American Car & Foundry Co.

The Illinois Central Electric Ry., Canton, Ill., has ordered one double-truck combination baggage and passenger car and two double-truck motor passenger cars from the McGuire-Cummings Co.

The Louisville & Nashville is said to have ordered material for 300 freight cars, to be built at its own shops, in addition to the 1,000 cars mentioned in the Railroad Age Gazette of January 15. This latter item is not yet confirmed.

The United States Government has ordered 22 dirt cars and a mile of portable track from the Youngstown Car Manufacturing Co., Youngstown, Ohio, to be used in Honolulu, where the government is doing a large amount of cement work.

The Western Pacific is in the market for 1,500 steel underframe box cars of 80,000 lbs. capacity, 250 flat cars of 100,000 lbs. capacity, 50 caboose cars of 60,000 lbs. capacity and 750 steel superstructure, steel underframe stock cars of 80,000 lbs. capacity.

The Minneapolis & St. Louis has ordered 250 thirty-ton box cars from the Mt. Vernon Car Manufacturing Co., for July delivery. Specifications are to be the same as on the last lot ordered, reported in the Railroad Age Gazette of April 2, 1909.

The Iowa Central has ordered 250 forty-ton gondola cars from the Mt. Vernon Car Manufacturing Co., for June delivery. Specifications are to be the same as on the last lot ordered, reported in the Railroad Age Gazette of October 2, 1908.

The Charlotte Harbor & Northern is in the market for 6

passenger coaches, 2 baggage and express, 2 postal and 150 freight cars for its Plant City extension, which is now under construction. L. M. Fouts, 2nd Vice-Pres. and Gen. Mgr., 317 Duval building, Jacksonville, Fla.

*The Missouri, Kansas & Texas*, reported in the *Railroad Age Gazette* of March 26 as asking prices on passenger and freight cars, has divided this equipment among the American Car & Foundry Co., Ralston Steel Car Co., and Mt. Vernon Car Manufacturing Co.

*The Pennsylvania*, as reported in the *Railroad Age Gazette* of April 30, is to build at Altoona 15 all-steel dining cars, class D 70, with capacity for 30 passengers. They will weigh 147,000 lbs., and will measure 9 ft. 1 in. wide and 9 ft. 4½ in. high, inside, and 80 ft. 9¾ in. long, 10 ft. 1 in. wide and 14 ft. ½ in. high, over all. The special equipment includes:

Bolsters, body .....	None
Bolsters, truck .....	Steel plate
Brakes .....	Westinghouse
Brake-beams .....	Channel
Brake-shoes .....	Cast iron
Brasses .....	Penn. R.R. type
Couplers .....	Polar, Penn. R.R. type
Curtain fixtures .....	Curtain Supply Co.
Curtain material .....	Mercerized cotton, Pantasote backing
Door checks .....	Blount checks, Yale & Towne
Draft gear .....	Westinghouse friction
Dust guards .....	Penn. R.R. type
Heating system .....	Penn. R.R. type
Journal boxes .....	Penn. R.R. type
Lighting system .....	Electric
Paint .....	Penn. R.R. standard
Platforms .....	Penn. R.R.
Roofs .....	Penn. R.R.
Seats .....	Penn. R.R., mahogany
Seat covering .....	None
Slide bearings .....	Flat, 4 per truck
Springs .....	Penn. R.R. standard
Trucks .....	6-wheel, steel
Ventilators .....	Globe
Vestibules .....	Penn. R.R.
Vestibule diaphragms .....	Ajax
Vestibule trap doors .....	P. R.R., O. M. Edwards' fixtures
Wheels .....	Rolled steel
Window fixtures .....	O. M. Edwards

#### IRON AND STEEL.

*The Wabash* has ordered 300 tons of structural steel from the American Bridge Co.

*The Missouri, Oklahoma & Gulf* has ordered 10,000 tons of rails from the Illinois Steel Co.

*The Missouri, Kansas & Texas* is said to have ordered 15,000 tons of rails from the Illinois Steel Co.

*The Great Northern of England* has ordered 5,000 tons of 85-lb. rails from the Dominion Iron & Steel Co.

*The Missouri Pacific* is said to have ordered about 6,000 tons of structural steel for bridge work from the McClintic-Marshall Construction Co.

*The Chicago, Milwaukee & St. Paul*, reported in the *Railroad Age Gazette* of May 14 as being in the market for structural steel for bridge building, has ordered 675 tons from the American Bridge Co. and 900 tons from the Wisconsin Bridge & Iron Co.

*General Conditions in Steel.*—Probably the most convincing indication of substantial improvement in the steel situation lies in the fact that the United States Steel Corporation is said to have decided upon maintaining its wage scale and that the independent companies will restore wages to their former level. A prediction comes from one of the largest steel companies that the various mills will be operating on a normal basis by the end of this year. Steel manufacturers are reported to be antagonistic to any sharp upward movement in prices. A slow, moderate improvement will undoubtedly be of more permanent benefit to the industry. An attempt at any sharp increases would tend to cause consumers, who have lately made encouraging inquiries, to withdraw from the market.

#### RAILROAD STRUCTURES.

ANDREWS, IND.—The Wabash is building a concrete bridge at an estimated cost of about \$3,000.

CALVIN, OKLA.—The Missouri, Oklahoma & Gulf has given

the contract for bridging and grading to J. W. Hoffman & Co., Kansas City, Mo. Contracts for depots, section houses and miscellaneous structures will be let shortly.

DALLAS, TEX.—Press reports indicate that the Railroad Commission of Texas, acting under authority of the bill recently signed by Governor Campbell, will order the construction of union passenger stations at Dallas, Sherman, Denison, Tyler and Jacksonville.

DETROIT, MICH.—According to press reports the Michigan Central has bought four city blocks in Detroit as sites for yards in connection with the tunnel under the Detroit river and a union passenger station. (Sept. 4, p. 883.)

FORT WILLIAM, ONT.—The Canadian Pacific will build a plant for creosoting railway ties, and will also build other smaller plants throughout the West.

KANSAS CITY, MO.—An agreement has been reached by a committee of the City Council, H. L. Harmon, President of the Kansas City Terminal Railway, and attorneys representing the city and the railways, regarding the matter of damages to land, which, it is believed, clears away the last formidable obstacle in the way of the building of a new passenger station and new freight and passenger terminals. It is proposed to insert in the ordinance conferring the necessary franchises a provision that the Kansas City Terminal Railway shall pay into the city all the money, plus 10 per cent., that a commission composed of W. M. Sloan, for the city, and John A. Moore, for the railways, shall estimate as the probable damages to property caused by the building of proposed viaducts and subways. The railways have agreed to spend \$450,000 for park purposes. If the money they pay in for estimated damages proves inadequate, the city may provide for the payment of excess damages from this park fund, or it may provide for it by levying assessments on districts that will be benefited by the proposed improvements. In no case shall the city be responsible for any damages. Messrs. Sloan and Moore have secured options from various property owners which indicate that if a four-track passenger line is built the damages here provided for will aggregate \$225,000, and if a six-track line \$375,000. (Dec. 4, p. 1503.)

An officer writes that the Kansas City Southern will soon begin the construction of the new freight house in the West Bottoms and also new tracks. The office portion of the building will be of reinforced concrete, two stories high and cover a space 36 ft. x 60 ft. The freight warehouse, 36 ft. x 440 ft., will be of ordinary mill construction.

MACON, GA.—An officer writes that the oil house, round-house and other terminal facilities are now under construction and that the erecting shop and other engine repair buildings have not yet been commenced.

TEXAS CITY, TEX.—The Texas City Terminal Co. has announced that it will expend during the present year \$1,000,000 in enlarging its facilities. The improvements will consist of several miles of additional yard tracks and seven fireproof warehouses connected with the docks by electric conveyors.

TULSA, OKLA.—The St. Louis & San Francisco will build a viaduct, estimated to cost \$19,000.

WINCHESTER, KY.—The Lexington & Eastern has given the contract for the building of a \$15,000 brick passenger station to George Baker Long, Chattanooga, Tenn.

#### SIGNALING.

The General Railway Signal Co. has installed, experimentally, at Spuyten Duyvil, on the New York Central, a new jointless and bondless a.c. track circuit. The signal company this week took a party of signal engineers to inspect the installation.

The New York, Ontario & Western is to install automatic block signals on its line between Fulton, N. Y., and Oswego, 12 miles, single track. Distant signals will in most cases be fixed on the same post with a home signal. In all there will be 24 signals, style B, made by the Union Switch & Signal Company. There will be switch indicators of the semaphore



type. The circuits will be so arranged that a train will always have two home signals ahead of it to indicate stop against opposing trains.

The Cincinnati, Hamilton & Dayton is putting up automatic block signals on its line from Southside, Ohio, to Wyoming, 7½ miles. These signals will take the place of the telegraph block system, which has been in use on this part of the road for many years. The signals are three-position with the semaphore arms moving in the upper quadrant. Twelve highway crossings in this territory have automatic electric crossing bells, which will be controlled by means of the track circuits. These bells, which were made by the Railroad Supply Company, Chicago, were put up about a year ago. The C., H. & D. has just completed a new mechanical interlocking at New River, Ohio. In this plant the machine has 32 levers, with approach and route locking. The distant signals are worked by electric motors.

The Rock Island is to install a mechanical interlocking plant at the crossing of the Wabash at Gallatin, Mo. There will be a 40-lever Saxby & Farmer machine with 34 working levers for 54 functions. Approach and detector and electric locking with indications will be provided on both roads. On the Rock Island the semaphores will give indications in two positions in the upper right-hand quadrant; but they are power-operated and can easily be arranged to work in three positions when the block system is extended to include the plant. Dwarf signals on the Rock Island will be wire-connected and give two indications in the upper right-hand quadrant. On the Wabash the signals will give indications in the lower right-hand quadrant; the high hand signals will be pipe-connected and dwarf signals wire-connected. Distant signals will be power operated.

The Rock Island will install with its own forces a 24-lever Saxby & Farmer interlocking machine and plant at White City, Kan., where the M., K. & T. crosses its Kansas division. There will be 20 working levers. The high signals on the Rock Island will be power-operated, semi-automatic, three position, giving indications in the upper right-hand quadrant. Dwarf signals will give indication in the upper right-hand quadrant also, but will be wire-connected and operate from 0 deg. to 45 deg. only. On the M., K. & T. the high home signals will be pipe-connected and the distant and dwarf signals wire-connected. These will give indications in the lower right-hand quadrant, 60 deg. inclination. On the Rock Island automatic block signals are already in service through White City and the plant will be taken into the block system. Approach, detector and indication electric locking will be provided on both roads.

#### British Patents Law.

An abstract from the *Sheffield Daily Independent* of March 15 gives the following figures showing the extent to which England claims to have benefited by the new patents law: "Since this act came into operation, in August, 1907, the country has benefited by foreign capital to the extent of \$1,518,978, made up as follows: Value of rent and premises acquired by foreign manufacturers in England, \$570,690; amount expended on erection of buildings, housing of work people, etc., \$522,450; amount expended on plant, machinery and equipment of factories, \$425,838. The value of the annual assessment on which local authorities will receive taxes will be \$86,309 per annum.

Up to the present time nine patents in all have been revoked by the comptroller-general, the last one just announced being Patent No. 14,948, of 1900, concerning steam generators, which has been revoked on the application of the S. M. Car Syndicate. The districts which have so far benefited most by the advent of new industries from abroad are Enfield, Flintshire, Hayes, Leicester, Liverpool, London, Manchester and Warrington. At all of the factories English workmen for the most part are employed. In one or two instances the firms have brought over their own overseers to instruct the work people, and in some cases they have taken English hands abroad so as to initiate them into their methods."

## Supply Trade News.

The Marion Steam Shovel Co., Marion, Ohio, has increased its capital stock from \$1,000,000 to \$1,500,000.

The Chicago office of the Ernst Wiener Co., New York, has been moved to 1540 First National Bank building.

T. E. Drohan, Minneapolis sales manager of the Northern Electric Works, Madison, Wis., has resigned to take a position with the General Electric Co., Schenectady, N. Y.

The Harriman Lines have specified Bettendorf single center sill underframes, made by the Bettendorf Axle Co., Davenport, Iowa, for the 1,500 refrigerator cars ordered from the Pullman Company.

The Great Northern has specified the Farlow draft gear, made by the Farlow Draft Gear Co., Baltimore, Md., for the 500 refrigerator cars ordered by it from the American Car & Foundry Co.

The Homestead Valve Manufacturing Co., Pittsburgh, Pa., has appointed Woodward Wight & Co., New Orleans, La., to represent it in that territory. The firm will carry a stock of Homestead valves.

The Isthmian Canal Commission asks bids up to June 10 on valves, pipe fittings, etc.; bolts, screws and other hardware; wire rope, wood boring machine, drill chucks, drills, etc. (Circular No. 511.)

The Southern Railway has specified for the 114 passenger cars recently ordered, heating equipment made by the Gold Car Heating & Lighting Co., New York, and journal boxes made by the F. H. Symington Co., Baltimore, Md.

The Chicago, Milwaukee & St. Paul has specified National trap-doors, made by the General Railway Supply Co., Chicago, for the passenger cars ordered from the Pullman Company and from the Barney & Smith Car Co., reported in the *Railroad Age Gazette* of April 9.

The business of the laboratory of engineering chemistry, 93 Broad street, at Boston, Mass., established in 1886, has been incorporated under the name Arthur D. Little, Inc. The company is prepared to undertake any work involving the application of chemistry to industry.

The Indiana Engineering Co., Indianapolis, Ind., has been incorporated with a capital stock of \$30,000. The company proposes to construct steam and interurban railways, etc., and to carry on a general construction business. The incorporators are Henry T. Wilkerson, Albert K. Rowsell and Gilbert Helm.

Alfred Noble, Chief Engineer, East River division, of the Pennsylvania Tunnel & Terminal Railroad, which is the name under which the Pennsylvania tunnels on the New York extension are being built, and Silas H. Woodard, a Resident Engineer on this work, have opened an office as Civil and Consulting Engineers under the name Noble & Woodard at 7 East Forty-second street, New York.

E. D. Giberson and Frank E. Olin, formerly connected with the New York sales agency of the National Tube Co., Pittsburgh, Pa., have been appointed Eastern Sales Agents of the Ohio Seamless Tube Co., Shelby, Ohio, with offices at 2 Rector street, New York. The eastern territory will be handled by the New York office, and all inquiries originating in this territory should be addressed to that office.

Among the orders recently booked by the Crocker-Wheeler Co., Ampere, N. J., is one for a motor-generator set consisting of a 3-phase, 60-cycle, 2,300-volt, synchronous motor and a 575-volt direct-current dynamo, having a capacity of 300 kilowatts, for the Boise Valley Railway. The National Tube Co., McKeesport, Pa., has added to its 22,800 horse-power of Crocker-Wheeler motors 275 horse-power for the operation of saws and various rolling-mill machinery.

The Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio, has just established an agency in Canada for the sale of its product in the territory west of Lake Superior, with the Brydges Engineering & Supply Co., 249 Notre Dame avenue, Winnipeg, Man., and with Mussens Limited, 299 St. James street, for the sale of staybolt material in the territory east of Lake Superior.

It has also appointed H. J. Skelton & Co., London, England, sole representatives for the British Isles and India.

The Davis-Bournonville Co., New York, will have at the M. C. B. and M. M. convention at Atlantic City a working exhibit of its oxy-acetylene welding and cutting apparatus. As it may be possible that some of the members of the associations have about their shops broken parts of machinery that require particularly skilful welding, the company wishes to announce that it will be glad to do any welding necessary on work sent to them express paid, Atlantic City.

The partnership which, under varying names has for about 75 years owned the Baldwin Locomotive Works, is expected to terminate in June and be succeeded by a stock corporation. The two weeks' legal notice has been given and application for a charter from the state of Pennsylvania will be made on June 3. No change in personnel is indicated by this change in form of organization, which has become desirable, primarily, because of Mr. Henszey's death and the age of the senior partner.

The Pittsburgh office of the Darley Engineering Co., New York, has been abolished, and the engineering, purchasing and sales departments hitherto located there have been transferred to New York, where all communications should be sent. The Chicago office will remain, as at present, in the Monadnock building. The general officers of the company are now as follows: W. A. Stadelman, President and General Manager; C. L. Inslee, Vice-President; W. G. Hudson, Vice-President; W. W. Ricker, Treasurer; M. D. Chapman, Secretary.

It is officially announced that the Pullman Company will make additions to its works at Chicago which will involve an expenditure of about \$1,750,000. An extension of the shop in which passenger cars are made is now in progress which will increase the capacity of this shop about two-thirds, enabling it to turn out 150 cars a month. The company will later build a plant for the manufacture of steel freight cars which it is expected will have a capacity of 1,500 to 2,000 cars a month. The total capacity of the works when the contemplated improvements are completed will be about 30,000 cars a year. Detailed plans for the new freight car shop have not been finished.

Thomas A. Weston died in New York on May 3. He was 77 years old. He was born in England, but came to this country when quite young, and for a time was a clerk in the old hardware house of Pratt & Co., Buffalo, N. Y. He had an inventive mind and a natural aptitude for mechanics. His first and most widely known invention was the differential pulley block. The invention was patented in Great Britain and the United States, the licensees in the former being Tange Bros., Ltd., Birmingham, England, and in the latter the Yale & Towne Manufacturing Co., Stamford, Conn. Mr. Weston's next notable invention was the multiple disc brake, and his third and last important invention was the Triplex chain block. He made numerous minor inventions, and all of the latter part of his life was occupied in the study of mechanical problems.

#### TRADE PUBLICATIONS.

**Graphite Products.**—The Joseph Dixon Crucible Co., Jersey City, N. J., has just issued a pocket edition general catalogue, which contains lists of their principal products, such as crucibles, facings, lubricating graphite, greases, pencils, protective paint, etc.

**Air Cylinder Lubricator.**—The Detroit Lubricator Co., Detroit, Mich., has just issued a circular in reference to its Detroit sight feed air cylinder lubricator. This lubricator was illustrated and described in the *Railroad Age Gazette* of October 23, 1908.

**Distributing Transformers.**—Circular 1,502, just issued by the Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., describes the Westinghouse distributing transformers, 5 to 50 k.w. capacity. This is one of the standard Westinghouse publications for use in a loose leaf cover.

**Amatite Roofing.**—The Barrett Manufacturing Co., New York, will send samples of its Amatite roofing to interested parties. These samples show the roofing complete with the mineral surface, which replaces paint. From these samples

it will be easy to obtain a very good idea of just what this roofing is.

**Circuits for Power Distant Signals and Route Locking.**—The Union Switch & Signal Co., Swissvale, Pa., has issued bulletin No. 40 containing 21 diagrams, with explanatory text, showing the principal plans used by the company in arranging the wiring for power distant signals, indicators, approach locking, semi-automatic control, etc.

**Blow-Off System.**—The Horace L. Winslow Co., Chicago, successors to Julian L. Yale & Co., in an attractive catalogue, describes and illustrates the Clark blow-off system for use on locomotives. This system is designed to stop foaming, remove sludge and prevent scale formation. An inset shows a sectional elevation of a locomotive equipped with this blow off system.

**Reinforced Concrete Construction.**—The May number of the Bulletin of the Universal Portland Cement Co., Chicago, has for its leading article a description of a novel system for building a reinforced concrete dwelling house. The frame is composed of steel tubing, wire and malleable iron fittings, and can be erected entire before concreting is begun. Another short article tells of a hay storage warehouse in Chicago built with factory-made concrete columns and girders. There are also the usual photographic illustrations of other buildings in which "Universal" Portland cement is used.

**Record of Recent Construction.**—The Baldwin Locomotive Works, Philadelphia, Pa., has just issued Record No. 66 on the smokebox superheater and feed water heater. This is the standard publication and contains a number of half-tone illustrations and line drawings. An article entitled "Smokebox Superheater," by John W. Converse, the principal part of which was published in the *Railroad Age Gazette* of November 20, 1908, and an article entitled "The Advantages of the Use of Moderately Superheated Steam in Locomotive Practice" by Lawford H. Fry, which was published in the *Railroad Age Gazette* of March 5, 1909, are included in this issue.

#### Gold Universal Straight Port Steam Coupler.

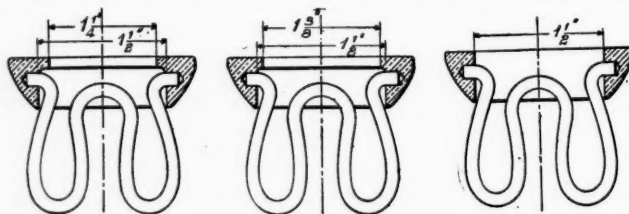
This two-piece steam coupler here shown was designed to meet a demand for one with which various sizes of hose and gaskets might be used. Three different sizes of hose, including 1¼-in., 1½-in. and 1⅝-in., inside diameter, may be used with the same coupler, the nipples having the same sized thread connection. It is only necessary to change the gasket according to the size of the hose used. This, however, is a simple matter, using a small hook in the upper part of the



#### Gold Universal Straight Port Steam Coupler.

three-looped wire shown in the sectional views of the gaskets. Cross sections of the three gaskets here illustrated have 1¼-in., 1½-in. and 1⅝-in. openings and have areas 1.2272 sq. in., 1.4849 sq. in. and 1.7671 sq. in. respectively.

This coupler is also designed to connect with the Gold No. 105 and No. 400 coupler, and with the medium sized ones of other makes. It is fitted with the Gold latest design of improved gravity relief trap, and may be used with or without the Gold lever lock. This coupler



#### Interchangeable Gaskets for Gold Steam Coupler.

has a 1½-in. bore; therefore by using the gasket with 1¼-in. opening it has the same passageway for steam as the larger couplers now in use on a number of trunk lines.

This coupler is made by the Gold Car Heating & Lighting Co., New York.